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DISEASES CAUSED BY BACTERIA AND FUNGI.

ALLISON, V. D., & GUNN, W. (1932). **The Epidemiology of Streptococcal Infections.**—*Proc. Roy. Soc. Med. London.* 25. 927-944. 2 tables, 3 charts. [46 refs.]

In the short space of an abstract justice cannot be given to this contribution, which will repay reading in the original.

Allison deals with the serological types amongst scarlatinal streptococci, their relative distribution and the occurrence of primary and secondary infecting types and their significance, discussing the possible explanations for change of type induced by antibodies *in vivo*, and reinfection. Passing to the exotoxins, he finds that, with certain exceptions, notably in Type I, strains of the same type produce toxins of about the same potency, but that differences exist between types, e.g. Type I—25,000 S.T.D., Type IV—1,500 S.T.D. per c.c.; he also concludes that some qualitative differences exist. The special epidemiology of tonsilitis, puerperal fever, and erysipelas and the presence of haemolytic streptococci as secondary invaders are then considered.

Gunn pleads for a broader conception of the pathogenic activities of the haemolytic streptococcus and adopts the clinical classification of GLOVER and GRIFFITH which is, briefly:—(1) symptomless infection, or carrier state; (2) febricula, feverish catarrh or pharyngitis; (3) tonsilitis and (4) typical scarlet fever, only found in association with a highly toxigenic strain. He discusses virulence, which he defines as invasiveness or the power to cause local complications and not necessarily associated intimately with the severity of the disease, toxigenicity, which is generally related to serological type but may be notably low in numbers of a type which is usually highly toxigenic, questions of dosage and effective contact, and finally latent infections. Haemolytic streptococci may cause various diseases and be the cause of secondary complications in others; the reservoir of infection is the nose and throat of the human subject and the clinical condition produced depends on the specific properties of the strain, the site of the implantation and invasion, and the resistance, local or general, of the host.

—A. W. STABLEFORTH.

- I. ANDREWES, F. W., & CHRISTIE, Ethel M. (1932). **The Haemolytic Streptococci: their Grouping by Agglutination.**—*Med. Res. Council. Spec. Rep. Ser.* No. 169. pp. 73. 24 figs., 5 tables. [24 refs.] London: H.M. Stat. Office. [1s. 3d.]
- II. —. (1932). **The Haemolytic Streptococci.**—*Brit. Med. J.* Oct. 8th. 681.

I. The main object of this research, which extended over a period of seven years and included the examination, with various degrees of elaborateness, of 200 strains of haemolytic streptococci from scarlet fever, puerperal sepsis, erysipelas and surgical infection, was to ascertain whether, by using the more refined methods of antigenic analysis, it was possible to construct a grouping likely to be of practical value in clinical work, and especially to see whether serological varieties could be correlated with apparently distinct diseases.

It was soon found that agglutination tests alone were inadequate and the greater part of the work was carried out by agglutinin-absorption tests. Much preliminary work was done in order to devise the best method of preparing suitable suspensions. This led to a study of acid-agglutination and astonishing facts were brought to light regarding the effect of the final, or even of the penultimate culture medium upon acid-agglutinability and serological behaviour.

Stress is laid on the extreme variability of *Streptococcus pyogenes*. Derivatives showing more or less specific or group properties may be obtained from the same strain or even from the same plate. Differences of this nature were particularly marked in the case of the Dochez strain. Sera prepared at different times, or against derivations of the same original strain carried on by various workers, had quite different properties. Again, some of the techniques recommended for the preparation of good agglutinable suspensions actually tend to the production of forms with preponderantly group characteristics and it may be that a worker who imagines he has recognized an association between serological type and disease has been led astray through working with a serum with pronounced group characteristics. Something was learnt about these group and specific characters by absorptions with single adequate doses but much more by graded absorptions and by mirror absorptions. Altogether 125 graded absorptions and 630 ungraded absorptions were carried out.

The individuality of certain type strains such as Griffith's main scarlatinal Types I, II and IV and of his Dochez strain was readily confirmed, but, as found by Griffith, a large number of scarlatinal strains are apparently serological singletons. No distinct types stood out amongst the puerperal, surgical and erysipelas strains although an occasional representation of Griffith's scarlatinal types was found. The authors conclude, "The more one studies haemolytic streptococci the more strongly is the impression gained that they are in a state of constant flux in which it is difficult to find any firm foundation for a permanent systematic classification."

It is an extensive and detailed report and will repay reading by all whose work concerns the classification of streptococci; its greatest value is that it reveals some of the many pitfalls which lie in the path of the unwary.

II. Annotation to above.—A. W. STABLEFORTH.

PHÉLOUKIS, T. (1932). Recherches sur la nature toxique de l'infection charbonneuse. [Researches on the Toxic Nature of Anthrax Infection].—*Bull. Acad. vét. France*. 5. 311-316. [6 refs.]

Details are given of an investigation conducted by the author to determine whether an anthrax toxin exists. His experiments included the study of the toxicity of the blood and body-fluids of animals experimentally infected with anthrax and also the study of the toxicity of artificial media used for the culture of *B. anthracis*.

He found that, in the early stages of the disease, the serum of experimentally infected animals contained soluble toxic products elaborated by the bacteria, though the organisms themselves were absent from the blood-stream. The presence of these products became less and less marked as the disease progressed,

to disappear just before death, this being attributed to the formation of completely atoxic combinations between the toxic elements and certain body cells.

He also found that, when the anthrax bacillus was cultivated *in vitro*, particularly under conditions analogous to those found in the body, e.g. in blood plasma, toxic products were present.

The author, however, does not consider that these should be regarded as toxins inasmuch as this term ought to be confined to bacterial extracts or killed cultures capable of reproducing experimentally the same symptoms and lesions as the living organisms.—GWILYM O. DAVIES.

BEGG, H. (1932). **Bovine Tuberculosis—Retrospective and Prospective.**—*Trans. Roy. Sanit. Ass. Scotland*. pp. 18-36.

The author discusses the conditions in the neighbourhood of Glasgow and says that the existing high incidence of tuberculosis in dairy cows developed along with the organization of the milk-contract system. Before the war, most milk in Renfrewshire was made into butter and cows were usually allowed a long dry season in the winter when little milk was produced. Late in 1917, as a result of governmental influence, milk production was encouraged so that the preparation of other dairy products was crowded out. This was the beginning of the "all the year round" milk-contract system which the author blames chiefly for the present high evidence of bovine tuberculosis as it created the necessity for a constant supply of calving cows with the consequent market traffic in these animals. He also considers that the chief factor in the actual development of extensive tuberculous infection in a cow is repeated pregnancies because of the associated mechanical and other strains on existent tuberculous lesions.

The second section of the address is prospective and deals with the future of bovine tuberculosis. Strong complaint is made about the delay in instituting a comprehensive effort to eradicate the disease and the essential details for successful eradication are discussed. Existing legislation is unsatisfactory. In average farm conditions it is impossible to build up a fresh herd on the same premises as an infected one.

The author proposes that all reacting cows over ten years old should be removed at once and that there should then be a gradual reduction in the maximum age at which cows are allowed to remain in a dairy herd. The author considers that the eradication scheme of the West of Scotland Division of the National Veterinary Medical Association of Great Britain and Ireland should be adopted.
—J. E.

HARE, T. (1932). **Tuberculosis in a Blackbird (*Turdus merula*).**—*Proc. Roy. Soc. Med. London*. 25. 1500-1501.

The author describes a case of subcutaneous tuberculosis of the face of a blackbird which had been known to live on a poultry farm. The three separate abscesses are described in detail. Diagnosis was based on microscopic evidence.
—J. E.

JAMESON, E. M. (1932). **A Study of Tuberculous Infection by Way of the Female Genital Tract.**—*Amer. Rev. Tuberc.* 25. 213-217. 1 table. [5 refs.]

Small tampons of absorbent cotton wool, soaked with a known quantity of a suspension of an attenuated strain of tubercle bacilli, were introduced into the vaginas of 12 healthy virginal guinea pigs and allowed to remain there from four to eight days. It was not known whether the strain of bacilli belonged to the human

or bovine types. Eighty-seven days later, ten of the guinea pigs gave a positive reaction to the intracutaneous tuberculin test.

Tuberculous lesions were found in the lymph nodes of five animals when *post-mortem* examinations were made 100 days later.

There was no difference in the number of "takes" secured in animals inoculated during oestrus or during the resting stage.—NORMAN DOBSON.

CHRISTISON, May H. (1932). **Dissociation and Variation of the Attenuated Bovine Tubercle Bacillus of Calmette and Guérin (B.C.G.) with Reference to Type-Stability and Virulence.**—*Zbl. Bakt. I. (Orig.)*. 125. 72-83. 16 figs., 1 table. [15 refs.] [Orig. in English].

The author briefly surveys the literature on the dissociation of BCG and, in view of the marked discrepancies in the results obtained by different workers, she has made some further observations.

A glycerol-bile-potato culture of BCG (No. 394) obtained from the Pasteur Institute was subcultured on glycerol-egg medium and then plated according to the technique of Petroff and Steenken. Three types of colonies were obtained. The pathogenicity of these colonies was tested by the intracardiac and subcutaneous injection of guinea pigs. Subcutaneous inoculation produced lesions at the site of injection in 8 out of 24 guinea pigs. Following intracardiac inoculation one guinea pig out of 5 inoculated with an R variant developed tuberculous lesions in the pericardium, an S variant caused lesions in the heart and internal organs of 3 guinea pigs out of 6, and an I variant caused lesions in the internal organs of 1 out of 5 guinea pigs.

The experiments failed to establish type-stability among the descendants of the various colony forms when subcultured on gentian violet egg medium, as claimed by PETROFF, BRANCH and STEENKEN.

"It seems somewhat significant that in the majority of instances in which progressive tuberculosis or extremely severe tuberculous changes have occurred in experimental animals the infecting strain of B.C.G. has at some time or other been cultivated in a manner other than that advocated by Calmette for the preparation of the vaccine, but it is evident from the reports of many investigators who have introduced B.C.G. into experimental animals and infants that the vaccine when prepared and administered strictly according to the direction of Calmette is apparently avirulent. While in the experiments recorded in this paper, most of the data indicate the avirulence of the organism, the fact remains that when cultures from an S dissociate were inoculated into guinea-pigs in seven cases the results showed that this derivative possessed a certain degree of virulence though of course in no way comparable to that of a recently isolated bovine tubercle bacillus. The observations of certain workers have suggested that B.C.G. does not possess a fixed or stable avirulence and that it may yield, under experimental conditions, a virulent derivative. Apart from pathogenicity the observations recorded reveal a remarkable variability in the biological characters of the organism and the possibility of its regaining virulence under conditions in which it is used for practical immunization must remain an open question."

—T. M. DOYLE.

VAN BENEDEN, J. (1932). *Recherches sur l'infection, l'hypersensibilité et l'immunité vis-à-vis des formes virulentes ou atténuées du virus tuberculeux.* [Researches on Infection, Hypersensitivity and Immunity Relative to Virulent or Attenuated Forms of *Mycobacterium tuberculosis*]. pp. 135. 14 figs. [174 refs.] Paris: Masson et Cie. [8vo.] [Fr. 25.]

Few subjects of experimental pathology have called forth so much study as tuberculosis. In this monograph the author summarizes his research during the last six years on infection and immunity in tuberculosis, with particular reference to the filtrable elements associated with the causal organism.

In his introduction, the author reviews the literature which has a bearing on the present conception of tuberculous infection and immunity, paying particular attention to the work of CALMETTE and GUÉRIN in connection with the hereditary attenuation of Koch's bacillus (BCG) and to that of VALTIS with reference to the Calmette-Valtis type of tuberculosis due to experimental infection with the filtrable elements of the organism.

The book consists of three sections. The first is devoted to a detailed bacteriological study of the filtrable elements of tuberculosis and amongst the many very interesting points which are covered are the verification of filtrable forms in tuberculosis and the variable activity of filtrates from liquid cultures and pathological products of tuberculous origin. It is also stated that discharges, exudates, etc., most rich in tubercle bacteria do not necessarily contain the most numerous filtrable forms, the reverse being more often the case. Furthermore, exudates, discharges, etc., from tuberculous lesions may be negative microscopically and yet produce the Calmette-Valtis type of infection in the guinea pig. In all cases where guinea pigs were experimentally infected with filtrate, the author has failed to find the typical nodular lesions associated with experimental tuberculous infection; but when enlarged lymphatic glands from animals so affected were ground up and passaged in series through guinea pigs, the typical lesions were produced.

In the second section, a study is made of BCG: Discussing the lesions produced by this strain, it is noted in contradistinction to lesions produced by the filtrable virus, that, generally speaking, BCG lesions are not re-inoculable to other animals. Furthermore it has not been possible in the author's experience to exalt the virulence of BCG nor has it been possible to dissociate the strain into virulent and avirulent elements.

In the final section, the author discusses the subject of infection, hypersensitivity and immunity in the light of his researches. He states that his work with the filtrable elements of the tuberculous virus and the attenuated strain of CALMETTE and GUÉRIN (BCG) has enabled him to differentiate various reactions associated with infection viz., hypersensitivity to tuberculin, hypersensitivity to superinfection (both of which conditions are frequently confused under the term "allergy") and immunity.

This publication forms a valuable addition to the ever increasing library on tuberculosis and is the result of careful and diligent research at the hands of a distinguished researcher. His claims, which are advanced in a very convincing manner, have an important bearing on the diagnosis and control of the disease and have such far-reaching consequences that all interested in the subject should make a close study of the author's original work.

—GWILYM O. DAVIES.

CARNE, H. R. (1932). **Caseous Lymphadenitis—The Disinfection of Shearing Machine Handpieces.**—*J. Sci. & Indust. Res. Australia* **5**, 212-214. 1 table.

Experiments in 1931, using a watery solution of certain coal tar disinfectants, having shown that this method gave rise to heating of the handpiece, similar experiments with coal tar disinfectants, but using heavy mineral naphtha as a vehicle and grease solvent for the yolk which accumulates on the handpiece, were designed and are reported on in this article.

The effective sterilization of handpieces artificially contaminated with *Corynebacterium pseudotuberculosis ovis* was only accomplished by using a 50 per cent. solution of cresylic acid, but the author is of the opinion that under shearing conditions a 10 per cent. solution of cresylic acid in mineral naphtha would be suitable.

A table shows the results obtained with various disinfectant mixtures.

—EDWARD F. PECK.

CARRÉ. (1932). Sur le rouget articulaire et osseux du mouton. [**Polyarthrititis in Sheep caused by *Erysipelothrix rhusiopathiae***].—*Bull. Acad. vét. France*, **5**, 301-307. 2 text figs.

Sporadic cases of ovine infection with the bacillus of swine erysipelas are probably widespread in France, but there also exist localized areas in which a high morbidity of from 10 to 23 per cent. is encountered. The disease usually assumes the form of a chronic and persistent arthritis. A *post-mortem* examination may show a definite pitting of the articular surfaces especially those of the femur, tibia and radius.

In this article, Carré shows that the intravenous inoculation of a lamb with a porcine culture induced a transient lameness followed by an apparent recovery, but a *post-mortem* examination seven months later revealed a slight infection of the tibiotarsal articulations which yielded a pure culture of the organism.

It is suggested that, under natural conditions, the umbilicus is the probable portal of entry.—R. E. GLOVER.

KONDO, S., YAMADA, S., & SUGIMURA, K. (1932). **Experimental Studies regarding Living Swine Erysipelas Vaccine. I. The Pathogenicity and Antigenic Property of Swine Erysipelas Bacilli treated with Acridin Derivative.**—*J. Jap. Soc. Vet. Sci.* 11. 131-151. [25 refs.] [Summary in English: abst. from authors' summary]

The authors cultivated four highly virulent strains of the swine erysipelas bacillus on agar containing trypanflavin or rivanol in proportions varying from 0.004 to 0.3 per cent. The organisms rapidly lost their infectivity and finally became totally avirulent. These apathogenic cultures were capable of inducing a solid immunity in mice and pigeons.

The following figures are quoted from the authors' summary:—

"The grade of virulence of these four strains was almost the same, viz. they were virulent enough to kill a mouse by subcutaneous inoculation of 0.0000000001 c.c. of forty-eight-hour broth culture. . . . Mice, treated with 0.000001 c.c. or more of the avirulent living broth culture of the bacilli, have safely withstood tenbillionfold minimum lethal doses of virulent erysipelas bacilli and the pigeons, inoculated with 0.5 c.c. of broth cultures, resisted also against about twobillionfold lethal doses."

It is suggested that these vaccines would be of value in swine.

[The extraordinary virulence of the cultures as recorded by these investigators appears to be at variance with the results of other workers on this disease].

—R. E. GLOVER.

LESBOUYRIES, ADAM, & ARGOUD. (1932). Mammite colibacillaire paraplégique de la Vache. [**Paraplegic Coliform Mastitis of the Cow**].—*Bull. Acad. vét. France.* 5. 321-325. 1 fig., 1 table. [8 refs.]

Out of about 200 cases of mastitis occurring annually in the practice of one of the authors, about 30 were followed by paraplegia. These always occurred during the summer. An acute mastitis with marked and characteristic alteration of the secretion developed five or six months after calving and was quickly complicated by paraplegia including rectal and vesical paralysis, and severe general symptoms. The temperature remained normal. Death usually followed in two or three days. In distinction from the paraplegia of milk fever, blood calcium and phosphorus were normal; injection of these or insufflation had no effect on the symptoms, and bleeding is said to have been one of the best means of treatment.

Bacteriological examination of secretion from four affected animals gave in each case a pure culture of a non-motile coliform bacterium which killed guinea pigs in a dose of 1 c.c. intraperitoneally.

A table is given showing the percentage of cases of mastitis due to coliform

bacteria reported by various workers. Of 1,883 cases of mastitis, 125 were due to these bacteria (6·5 per cent.).

The authors are emphatic that the condition is a true paraplegia and believe it to be due to toxins elaborated by the bacterium, whose virulence is particularly augmented in summer.—A. W. STABLEFORTH.

LEVINE, M., & ANDERSON, D. Q. (1932). **Two New Species of Bacteria causing Mustiness in Eggs.**—*J. Bact.* **23**. 337-347. 2 tables. [8 refs.]

The authors have isolated from musty eggs bacteria capable of reproducing the musty odour in culture or in artificially infected eggs. Two species and one variety are described, for which the following names are suggested :—*Pseudomonas graveolus*, *P. mucidoleus* and *P. mucidoleus* var. *tarda*.—NORMAN HOLE.

— (1932). **Duck's Eggs.**—*Lancet.* **223**. 357.

— (1932). **Bacilli in Eggs.**—*Brit. Med. J.* Sept. 10th. 523-524.

Two notes drawing attention to the recent papers by SCOTT and by DALLING and WARRACK ; the former author has shown ducks' eggs to be a source of infection in *Bact. aertrycke* food poisoning in man, whilst the latter have isolated *Bact. enteritidis* from 7 out of 166 eggs laid by 5 ducks whose serum had agglutinated *Bact. enteritidis* antigen. The elimination of reactors and thorough cooking of ducks' eggs is indicated.—NORMAN HOLE.

VENTURA, L. (1932). Sulla pielonefrite bacillare dei Bovini. [**Bacillary Pyelonephritis in Bovines**].—*Nuova Vet.* **10**. 16-20. 2 figs.

In this paper, the author describes, principally from the clinical standpoint, three cases of pyelonephritis in bovines. Some emphasis is laid upon the possibility of this condition occurring without evidence of disease in other organs and also upon the absence of or the small amount of pain exhibited by the animals. There is not necessarily any loss of condition.—A. LESLIE SHEATHER.

KNOTH, M. (1932). Ueber Infektion mit Geflügelcholera-bazillen beim Schwein. [**Infection in the Pig with the Fowl Cholera Bacillus**].—*Tierärztl. Rdsch.* **38**. 261-262. [13 refs.]

Apart from a reference by LIGNIÈRES to the production of diarrhoea in a young pig by the administration of fowl cholera bacilli, and one by STANG and PFERSDORF regarding the occurrence of illness in fowls and pigs simultaneously and attributed to the fowl cholera bacillus, there appear to be no descriptions of infection of pigs with this organism in literature.

Knoth describes an outbreak in pigs which appeared to follow the ingestion by these of parts of some fowls which had died of fowl cholera. The disease ran a very rapid course. Reddening of the skin, petechiae of the epicardium and inflammation of the intestinal mucous membrane were found at the *post-mortem* examination. A bipolar organism which caused a rapidly fatal septicaemia in mice was recovered from the pigs' carcasses.—A. LESLIE SHEATHER.

MARSH, H. (1932). **Mastitis in Ewes, caused by Infection with a Pasteurella.**—*J. Amer. Vet. Med. Ass.* **81**. 376-382. 3 figs. [3 refs.]

A form of mastitis is described which affects range ewes when the lambs are from three to four months old. The condition is known to sheep owners as "blue bag." Five per cent. of the flock may be affected, usually one side only of the udder being attacked. Symptoms develop rapidly with high fever and loss of appetite. After 48 hours the fever subsides and the mastitis continues to develop.

Death may occur within a week from toxæmia or a chronic abscess forms in the udder and the ewe returns to its otherwise normal health.

An organism belonging to the pasteurella group is believed to be the cause. It closely resembles Jones' Type III *Pasteurella bovisseptica*. A healthy lactating ewe was infected through the teat with a pure culture of the organism with a fatal result.

Marsh compares this disease with mastitis of ewes in Europe and suggests that *Bacterium mastitidis* as described by MIESSNER and SCHOOP may be identical with his pasteurella.

[MIESSNER and SCHOOP state that *Bact. mastitidis* is very similar to *Bact. purifaciens* (Christiansen) and to Dungal's bacterium of ovine pneumonia].

—S. H. GAIGER.

COHEN, A. (1932). La pasteurellose du lapin et le traitement par l'autovaccin.

[**Pasteurellosis of the Rabbit and Treatment by Autogenous Vaccine**]. pp. 48. [24 refs.] [Thesis for Docteur vétérinaire, Alfort.]

The first 26 pages of this thesis consist of a histological, morphological, biological and immunological account of the pasteurelloses in general. The remaining 20 pages deal with pasteurellosis of rabbits, the condition being that described amongst rabbit fanciers as "snuffles." The history, aetiology, mode of infection, pathological anatomy, symptoms, diagnosis and immunity of rabbit pasteurellosis are very briefly described and it does not appear that anything new has been added by the author to existing knowledge of this disease. Antiserum has not given encouraging results and the author recommends the use of an autogenous vaccine.—S. H. GAIGER.

GILMAN, H. L. (1933). **What should constitute a Satisfactory Bang's Disease Test for Interstate Shipment.**—*Vet. Med.* 28. 37-38.

From experience in New York State, the author is of the opinion that the tube test is preferable to the rapid or plate agglutination test and that the exact agglutination titre of the cow's serum should be stated on certificates in preference to a mere note of "positive" or "negative." He makes the point that "the animal agglutinating at 1 : 50 from a herd known to have been free from the disease for some time is a far more desirable individual than a non-reactor or one with a titre of 1 : 25 that has been picked at random from a positive herd or one of unknown status." The status of the herd should be shown on the agglutination chart.—EDWARD F. PECK.

I. KING, R. O. C. (1932). **Contagious Abortion in Bulls. A Review of Recent Agglutination Tests.**—*Austral. Vet. J.* 8. 226-230. 4 tables. [7 refs.]

II. COTTON, W. E. (1932). **Efficacy of Different Strains of *Br. abortus* as Immunizing Agents against Infectious Abortion.**—*J. Agric. Res.* 45. 705-724. 11 tables. [3 refs.]

I. Positive reactions in bulls have been few until recently. Of 104 bulls tested, 9.6 per cent. were positive. In one positive case no agglutination occurred in the diagnostic dilutions—from 1 : 40 to 1 : 100. Following this the test was extended—from 1 : 20 to 1 : 1,000. Only two sera showed complete agglutination at 1 : 1,000. Complete agglutination in 1 : 100 is regarded as positive. The titre of the serum of one bull tested four times over a period of a year rose from 1 : 40 (suspicious) to 1 : 100 (positive) and then fell to 1 : 70 (highly suspicious).

Four of the positive bulls showed clinical symptoms of which orchitis was the most constant. One bull was examined *post-mortem* and lesions of the testicles

and prostate were found, *Br. abortus* being isolated from the seminal vesicles.

II. Two experiments were made. Three groups of cattle were inoculated before conception with avirulent bovine, virulent porcine and virulent bovine vaccines, one vaccine being used in each group. A fourth group was kept as a control. In the other experiment the avirulent bovine and virulent swine vaccines were injected during pregnancy and suitable controls kept. All the animals were subsequently exposed to infection with virulent bovine organisms.

The virulent bovine vaccine was the most effective when given to empty cows: the porcine type when given during pregnancy. In pregnant animals the avirulent bovine vaccine "seemed to increase resistance to the progress of the disease." Neither the virulent porcine nor virulent bovine vaccines prevented udder infection, but in a proportion of cases were directly responsible for such infection. For this reason the use of the porcine type of organism as a vaccine, although conferring definite immunity on pregnant animals, is contraindicated.

[There is a misprint in the heading to table 9. For "vaccinated with a virulent bovine strain," read "vaccinated with an avirulent bovine strain"].

—GEORGE SLAVIN.

I. SUNDBERG, R. (1931). Virulensmätningar av 4 olika abortbacill-stammar med användning av marsvinsympning och upprepade bestämningar av de ympade marsvinens agglutininhalt. [**Virulence Estimations of Four Different Strains of *Br. abortus* by Guinea Pig Inoculation and Repeated Determinations of the Agglutinin Content of these Animals**].—*Skand. Vet.-tidskr.* 21. 97-102. 1 table.

II. TULLBERG, K. (1931). Experimentell prövning av den subkutana abort-vaccinationens immunvärde hos ko. [**Tests on the Immunizing Value of *Br. abortus* Vaccine applied subcutaneously to Cows**].—*Ibid.* 222-229. 1 table. [1 ref.]

I. The author has endeavoured, by inoculating guinea pigs and afterwards following determinations of agglutinin titre to ascertain the virulence of different strains of *Br. abortus*. From four different strains a suspension of bacilli (0.1 volume per cent.) was made in saline. 1 c.c. of such a suspension of each strain was injected subcutaneously into 32 guinea pigs. Every 14th day four guinea pigs were killed in each group, after which the agglutinin percentage of the blood was determined. It was found that the strains which regularly gave the highest agglutination titres were the most virulent. From these experiments the author has concluded that it is possible, as a rule, to estimate the virulence of the strains examined by this method.

II. The author has investigated whether a subcutaneous inoculation with *Br. abortus* dead vaccine confers any resistance against *abortus* infection. Of four pregnant cows two were inoculated with 15 c.c. of the vaccine. Two months after vaccination all four cows were infected with the same dose of culture. Of the vaccinated cows one aborted 51 days and the other 82 days after infection and the control cows 54 and 63 days respectively after infection. Thus the vaccination does not seem to have been of much use as a preventive.

—N. LAGERLÖF (STOCKHOLM).

MAGNUSSON, H. (1932). Bursiter med Bang-infektion hos häst. [**Bursitis associated with Bang Infection in the Horse**].—*Skand. Vet.-tidskr.* 22. 95-103. 1 fig. [7 refs.] [Summary in English: abst. from orig.]

A review of the records of previous writers on the interrelation between

Br. abortus and the several types of bursitis in the horse is followed by the author's observations on four cases of fistulous withers.

In 1919 FONTAINE and LÜTTJES observed that the serum of some horses agglutinated *Br. abortus* and that a number of reactors were affected with fistulous withers; conversely, the serum of many animals suffering from fistulous withers was found to agglutinate *Br. abortus*. Other workers have substantiated these findings and *Br. abortus* has occasionally been isolated from the lesions. FITCH, BISHOP and BOYD induced an artificial poll-evil by injecting cultures of the organisms into the ligamentum nuchae. VAN DER HOEDEN demonstrated the bacillus in lesions of tendinitis, costal fistula, sinusitis and bog-spavin in the horse.

Magnusson investigated four cases of fistulous withers in all of which the agglutination test was positive. *Br. abortus* was found in two of the three instances that culture was attempted. Two of the animals lived on farms where the cattle were suffering from contagious abortion. Seven horses were infected experimentally by the conjunctival route with strains of *Br. abortus* isolated both from the horse and from the ox. A positive agglutination test resulted in five instances, but no local lesions of bursitis were detected. It is concluded that the bursitis of fistulous withers, at least, is primary and that the presence of *Br. abortus* represents a secondary infection.—G. B. BROOK.

JADASSOHN, W. (1932). Brucella-Bang-Ausschlag und Urticaria bei Tierärzten. [**Brucella-Bang-Eruption and Urticaria in Veterinarians**].—*Arch. Dermatol.* 164. 656-660. [6 refs.]

In a veterinarian who had been in practice for one and a half years, skin reactions of two kinds occurred after bovine obstetrical operations. The first was an urticaria which appeared regularly, during or immediately after the operation. This was apparently due, not to *Br. abortus* or its products or to bacteria of any kind, but to an increased sensitization to some ox substance which was also shown to be present in normal allantoic fluid and in beef broth. The second was a papular eruption which occurred several hours later and only on certain occasions. This was similar to that described by HAXTHAUSEN and THOMSEN and was in all probability due to contact with *Br. abortus*. The cause of a third eczematous condition of the forearm and back of the hand, which was constantly present during working periods, but was notably bettered when not practising, was not found.—A. W. STABLEFORTH.

— (1932). Fiebre ondulante y Brucelosis de los animales en la Republica Argentina. [**Undulant Fever and Brucellosis in Animals in the Argentine Republic**].—*Rev. Zootéc.* 19. 412-415.

Human brucella infection has been reported from 12 areas in the Argentine. In six areas the infection has been established in goats and in four areas in bovines or swine. The National Commission for the Study of Undulant Fever (Argentine Republic) has issued the following requests:—(1) that medical practitioners should send blood samples to the National Department of Hygiene, (a) in cases of suspected paratyphoid infection where a negative Widal reaction is obtained, (b) from patients whose symptoms or history are at all indicative of undulant fever, (c) in atypical cases of malaria and (d) when the patient is known to have handled such material as aborted fetuses or foetal membranes from bovines; (2) that veterinary surgeons should send samples from suspected bovines; (3) in order that attempts to isolate brucella strains may be thorough, laboratory workers should incubate blood cultures for a week and, if negative results are obtained, sub-

cultivate from the original for a month at intervals of four days and (4) that they should test all sera for brucella agglutinins.—R. S. ROBERTS.

SGAMBATI, A. (1932). L'Actinobacilloso in Cirenaica. [**Actinobacillosis in Cyrenaica**].—*Nuovo Vet.* **10**, 293-296.

The author finds that actinobacillosis occurs in about 2 per cent. of the indigenous animals in Cyrenaica. Actinomycosis has not been detected. Actinobacillosis has been seen in young and old animals and also in animals from parts of the country at different altitudes.—A. LESLIE SHEATHER.

DISEASES CAUSED BY PROTOZOAN PARASITES.

YAKIMOFF, W. L. (1932). Ueber die Desinfektion bei Kaninchenkokzidiose. [**Disinfection in Rabbit Coccidiosis**].—*Tierärztl. Rdsch.* **38**, 663-666. 9 tables. [6 refs.]

The author gives tabular statements showing the effects of solutions of disinfectants of different strengths acting for varying periods upon the sporulation of coccidia from rabbits.

His general conclusion is that chemical disinfectants are not satisfactory for killing the parasites, and that physical methods are far more satisfactory. A temperature of 40°C. is fatal because of the drying effect produced. At 45°C. faeces are completely dried in two hours and the oocysts are destroyed. With higher temperatures destruction is increasingly rapid. At 80°C. an exposure of ten seconds is fatal.

At low temperatures, e.g. 0°C., the parasites retain their vitality, but do not develop sporozoites. At -15°C. the great majority of the parasites in faeces are killed.—A. LESLIE SHEATHER.

ALLEN, Ena A. (1932). **The Influence of Diet on the Development of Experimental Coccidiosis in Chickens kept under Sanitary Conditions.**—*Amer. J. Hyg.* **15**, 163-185. 4 tables, 2 graphs. [13 refs.]

The author reviews the available literature relating to the influence of diet upon parasitism in poultry. He records the results of three adequately controlled and carefully carried out experiments, in which chicks under two weeks old were placed on diets of known composition, a proportion of the total number being infected artificially with *Eimeria tenella*. Two types of rations were studied in this manner. Ration A contained from 20 to 22 per cent. protein and exceeded ration B in vitamins A and B by 40 and 20 per cent. respectively. Ration B was varied to contain from 14.5 to 15.5 or from 17.5 to 19 per cent. protein. [The normal percentage of protein in chick rations varies from 10 to 15 per cent.].

In the first experiment, 48 chicks were infected, 24 being kept as controls; half of each group were fed on ration A and half on ration B. In the second experiment, similar groups were used, but in half of each group the rations were interchanged at the time of infection. The third experiment was similar to the first, but a more effective technique was adopted. The numbers of oocysts fed and the time for which the chicks were allowed to survive varied in each experiment.

All infected chicks developed the disease and no oocysts were at any time voided by the controls. The third experiment was complicated by the appearance of *Bact. pullorum* infection.

Chicks on ration A had a consistently lower oocyst production for the first five days after the first appearance of oocysts and the total number produced at

the height of infection was about half of that in chickens on ration B. On the fifth or sixth days the curves for oocyst production crossed and by the 18th day chicks on ration A showed seven times as many oocysts in the caeca as those on ration B. Mortality amongst chicks on ration A was 5 per cent. and in those on ration B, 23 per cent. Briefly, the infection in chicks on ration A was of a subacute nature, tending to become chronic, whilst in those on ration B the disease was acute and recovery was almost complete.

Amongst the control chicks those on ration A increased in weight far more rapidly than those on ration B, but the average weight of infected chicks on ration A was 79 per cent. of that of the survivors on ration B.

The correlation between diet and the course of coccidiosis is adequately established, but in the experiments there were at least two variable factors, namely, the percentages of protein and vitamins. Further experiments, in which one factor only is varied, are necessary before exact conclusions can be drawn.

[It should be pointed out that the chicks were kept on wire mesh floors and every practicable precaution taken against reinfection. The conclusions, therefore, may not be applicable to chicks under farm conditions].—R. S. ROBERTS.

HENRY, A., & MASSON, G. (1932). Considérations sur le genre *Globidium*. *Globidium cameli*. n. sp., Parasite du Dromadaire. [**The Genus *Globidium*. *Globidium cameli* n. sp., Parasite of the Dromedary**].—*Ann. Parasitol.* 10. 385-401. 2 plates, 1 table. [24 refs.]

After dealing briefly with the history of the genus *Globidium* the authors propose a modification of the definition of the genus. Their definition runs as follows:—"Coccidies volumineuses, dont le développement comporte: d'un part des oocystes de grandes dimensions, à paroi épaisse (formée par la fusion de gros corpuscles ou globules réfringents), d'autre part, des formes de reproduction endogène qui acquièrent une grande taille." Large coccidia, the development of which comprises on the one hand large oocysts with thick walls (formed by the fusion of large refractile corpuscles or globules) and on the other hand, endogenous reproductive forms which attain a large size.

The authors deal at some length with the views which have been put forward regarding the genus *Globidium* and its relationships and they conclude that up to the present the genus comprises only three definite species:—*G. leuckarti*, the type species of the genus occurring in the horse, *G. faurei*, in the sheep and goat and *G. besnoiti* in the ox. To these the authors add a new species, *G. cameli*.

It is impossible to abstract the detailed account which the authors give of the organism they have found. The organism was found in the mucous membrane of the terminal portion of the ileum of a dromedary at Alfort.

The outstanding features of the organism were:—length, from 80 to 100 μ by breadth, from 65 to 80 μ ; the wall ranged from 10.5 to 15.6 μ in thickness; there was a micropyle measuring from 10 to 14 μ at the smaller pole.

—A. LESLIE SHEATHER.

CARPANO. (1932). Localisation du *Trypanosoma theileri* dans les organes internes des bovins. Son cycle évolutif. [**The Distribution of *Trypanosoma theileri* in the Internal Organs of Cattle. The Development Cycle**].—*Ann. Parasitol.* 10. 305-322. 2 figs., 2 plates. [45 refs.]

The author records finding forms of *T. theileri* in the brain and lymphatic glands of cattle. The forms, which consisted of *Crithidia*, *Leptomonas*, *Leishmania* and *Plasmodia*, gave evidence of multiplication. The forms described as *Plasmodia* possessed a nucleus and a blepharoplast. The author deduces from these forms

that the life history of *T. theileri* resembles that of *T. cruzi*. He also suggests that the invertebrate host is *Hyalomma aegyptium*. [No evidence is produced of the existence of intracellular cysts or of schizogony and although *H. aegyptium* may act as transmitter it cannot be the only invertebrate host, as *T. theileri* has been recorded where *H. aegyptium* does not exist].—U. F. RICHARDSON.

MORRIS, K. R. S. (1932). **The Infection of a Guinea-Pig with *Trypanosoma congolense* and *T. gambiense* from the Bite of *Glossina longipalpis*.**—*Ann. Trop. Med. & Parasitol.* **26**, 129-138. 1 fig., 3 charts. [2 refs.]

Examination of wild *G. longipalpis* at Takoradi, Gold Coast, in May and June, 1931, showed that 20 per cent. were infected by *T. congolense* and 4 per cent. with *T. vivax*. Infected flies were fed on six guinea pigs; one animal developed a mixed infection of *T. congolense* and *T. gambiense* and the remainder did not show any infection. Another guinea pig, inoculated from the infected one on June 18th, showed *T. gambiense* on June 26th and *T. congolense* seven days later. In guinea pigs *T. congolense* appeared to be mainly responsible for death. In sub-inoculated rats *T. gambiense* appeared in from three to four days and killed in from six to twelve days, *T. congolense* appearing in the later stages.

[The paper does not mention whether any attempt was made to isolate in a state of purity the strains involved.]—U. F. RICHARDSON.

TALIAFERRO, W. H. (1932). **Trypanocidal and Reproduction-Inhibiting Antibodies to *Trypanosoma lewisi* in Rats and Rabbits.**—*Amer. J. Hyg.* **16**, 32-84. 17 tables. [32 refs.]

The sera, or separated fractions of sera, were tested both for curative and protective values. In protective experiments the material to be tested was given intraperitoneally and the trypanosomes intravenously. In testing the curative property, as far as possible, rats were used which showed less than five trypanosomes in a fresh mount of blood when examined with an $\times 10$ ocular and a 4 mm. objective. Passage strains of trypanosomes were used to avoid any confusion which might arise from trypanosomes becoming body-fast. It was found that both the trypanocidal and the reproduction-inhibiting antibodies were precipitated with the euglobulin fraction of the serum and sometimes with both the euglobulin and pseudoglobulin fractions. The trypanocidal antibody could be removed from serum by absorption with trypanosome suspensions; the treated trypanosomes were sensitized and when injected into a normal rat were rapidly killed. The reproduction-inhibiting antibody could not be removed by absorption nor were the trypanosomes used sensitized. This antibody could be produced in rats by immunization with killed trypanosomes. One form of antibody can be produced in rats without the other and they can also be separated by absorption. In rabbits only the trypanocidal antibody is produced. The author suggests the name "ablastin" for the new type of antibody represented by the reproduction-inhibiting property.

The author suggests that the trypanocidal antibody rarely destroys all trypanosomes and that when a trypanocidal crisis is permanent it may be due to the co-operation of the reproduction-inhibiting body which prevents the multiplication of survivors.

It is uncertain whether the persistence of these antibodies is associated with persisting trypanosomes, but sometimes splenectomy will cause a relapse many months after apparent cure.—U. F. RICHARDSON.

RIEDMÜLLER, L. (1932). Zur Frage der ätiologischen Bedeutung der bei

Pyometra und sporadischem Abortus des Rindes gefundenen Trichomonaden. [**The Aetiological Importance of Trichomonads in Pyometra and Sporadic Abortion of Cattle**].—*Schweiz. Arch. Tierhkl.* **74**, 343-351. 2 tables. [9 refs.]

Two cases of abortion, at 27 and 20 weeks respectively, are described, in which no bacteria could be detected, but in which trichomonads were present in large numbers in the stomach contents and peritoneal fluid of the foetuses.

Complement-fixation tests were carried out with an antigen prepared from washed trichomonads from the peritoneal fluids of inoculated guinea pigs, as it was hoped that these tests would provide additional evidence on the question of the aetiological importance of the trichomonads. The tests were positive for the two animals under report, but tests made four weeks later in one case and eight weeks later in the other yielded doubtful results. Uninfected animals gave negative results but, in nine other cattle with trichomonad infection, eight negative readings and one doubtful reading were obtained.

The author considers that *Trichomonas bovis* differs from *Trichomonas vaginalis* of human beings both morphologically and in its ability to infect guinea pigs.

—U. F. RICHARDSON.

RASTEGAIEFF, E. F. (1932). Protozoologische Notizen. I. Fall von Sarkozysten im Blute der Rinder. [**Protozoological Notes. I. Sarcocysts in the Blood of Cattle**].—*Berl. tierärztl. Wschr.* **48**, 528. 1 fig. [13 refs.]

This article enumerates the published records bearing on the distribution of sarcocysts and spirochaetes in cattle and reports the detection of *Sarcocystis hirsuta* in smears of heart blood and *Spirochaeta theileri* in lung smears from cattle at Zurnabad in Asia Minor.—U. F. RICHARDSON.

HANEL, R. (1931). Sarkosporidiose in Tumorform beim Pferd. [**Sarcosporidiosis in a Horse associated with Tumour-Like Swellings**].—*Zschr. Infektkr. Haust.* **40**, 227-257. 6 figs. [56 refs.]

A considerable part of this paper is devoted to sarcosporidiosis in general, the author dealing with the zoological position of the parasite, its frequency of occurrence, situation in the body, method of infection and pathogenicity.

The case which came under the author's notice occurred in a four and a half year old draught horse. Painless, firm, tumour-like swellings were present on various parts of the body. The appearance of the lesions—although there was no suppuration—raised a suspicion of farcy, but a mallein test and serological tests were negative. Poulticing some of the swellings, which it was thought might possibly be atypical strangles abscesses, was also without result. Blood tests showed a reduction in the haemoglobin and red corpuscles and a marked increase in the white corpuscles. This was particularly the case with the eosinophiles.

Under chloral anaesthesia one of the "tumours" was removed for microscopic examination. This revealed the presence of a marked cirrhosis of the muscular tissue and an intense eosinophile infiltration. In parts the fibrous tissue had almost completely destroyed the muscle fibres.

The author states that sarcosporidia were found in the muscle fibres, but none of his illustrations makes it clear that the parasite was actually present. In the clinical account of the case, reference is made to the sudden appearance and disappearance of the tumour-like growths on the breast, and this is explained by supposing that it was due to local action of the toxin produced by the parasite, and not a solid mass of tissue. It is remarkable that the animal wasted very rapidly. Nothing was found to explain this.—A. LESLIE SHEATHER.

DISEASES CAUSED BY VIRUSES.

RIVERS, T. M. (1932). **The Nature of Viruses.**—*Physiol. Rev.* **12**, 423-452. 4 figs. [228 refs.]

The viruses—the “infinitely small in biology”—are characterized by the intimate relation that exists between them and their host cells. The prevailing concepts regarding their nature may be grouped under the four following headings :—(1) certain stimuli produce within the cells changes that are inherited by daughter cells ; malignant neoplasms are often held to arise in some such way, but the idea is rarely brought forward to explain the manner in which disease can be caused by the viruses ; (2) stimuli induce cells to make a substance x which is closely bound to parts y of the cells, forming an xy complex ; (3) stimuli incite normal cells to produce a substance x , which is not closely bound to parts of the cells and which then passes either directly into daughter cells, or, having become extracellular, enters a new group of normal cells and (4) the substance x is not a product of cellular perversion, but a minute living organism.

For practical purposes, it may not matter which of the last three concepts is accepted : according to each of these concepts x is antigenic and cells freed from it may become normal again. Theoretically, however, there are fundamental differences among them, for while according to the first two of these three concepts x is an inanimate agent, the product of cellular perversion, according to the last concept it is an autonomous organism. The easiest way would be to accept, from presumptive evidence, this last idea to define the nature of the viruses. But it may not be the right course. The present state of our knowledge is so confused that no unequivocal evidence has been adduced to support the validity of any of the above concepts. [This conclusion is based upon a terse criticism of each aspect of our present knowledge, mainly from the viewpoint of a worker highly skilled in some of the methods now employed in laboratories for the investigation of the viruses].—J. T. EDWARDS.

WALDMANN, O. (1932). Ueber die Pluralität bei Maul- und Klauenseuche und ihre praktische Bedeutung. [**On Plurality in Foot and Mouth Disease and its Practical Significance**].—*Berl. tierärztl. Wschr.* **48**, 689-691.

The author comments on the surprising statement of VON LASZLO [see this *Bulletin*, **2**, 607.] who stated that, in attempting to identify the strain of virus causing foot and mouth disease in Austria in 1930 he could find no difference in the three stock strains A, B and C sent from Riems for the purpose. Waldmann sent similar samples of the Riems strains to RINJARD in France and to GALLOWAY in England and both replied that the three strains remained pure and immunologically different. It is therefore assumed that insufficient steps were taken to prevent cross-infection of the test animals in VON LASZLO's laboratory so that they actually became infected with all three strains of the virus.—J. E.

WARE, F., & BANERJI, P. C. (1932). **The Control of Foot-and-Mouth Disease by Iodine.**—*Ind. J. Vet. Sci. & Anim. Husb.* **2**, 103-130. 6 tables. [5 refs.]

The experiments carried out confirm the findings of the British Foot and Mouth Disease Research Committee's work, published in the Fourth Progress Report. Iodine has no specific action upon the virus of foot and mouth disease and does not arrest the development of lesions.—NORMAN DOBSON.

JACOTOT, H. (1932). Observations et recherches sur la peste bovine du bétail d'Indochine. [**Observations and Experiments on Rinderpest in Cattle in Indo-China**].—*Arch. Inst. Pasteur d'Indochine*. **15**, 7-95.

This article covers a very large field of observations and experiments on rinderpest, of which the following notes indicate the nature and importance.

SUSCEPTIBLE ANIMALS.—Goats were susceptible to inoculation with virus, but did not contract the disease regularly on exposure to natural infection. Both wild and domestic pigs were susceptible to contact infection. The virus could be recovered from rabbits six days after inoculation, but could not be transmitted in series through rabbits. The virus could also be recovered from the blood of vaccinated cattle after inoculation with virus, although no symptoms developed.

PRESERVATION OF THE VIRUS.—Dried spleen pulp kept at 0°C. proved virulent up to five months whilst blood kept at the same temperature lost its virulence in 15 days.

VIRUS CARRIERS.—No evidence of the presence of virus in recovered cattle could be obtained. 14 per cent. of pregnant cows aborted after serum-simultaneous inoculation; and, in the cases of two abortions on the 21st and 33rd day after inoculation, the foetal tissues were found to contain the virus, but in 15 cases no virus could be detected in the foetuses.

SERUM PREPARATION.—The use of virulent spleen pulp in addition to virulent blood is recommended for hyperimmunization.

VACCINES.—These have been used on a large scale in both liquid and dried forms. 400,000 doses were manufactured in two years and 200,000 doses used. In the field very satisfactory results were obtained by the use in infected areas of serum and vaccine, given simultaneously. In buffaloes the dose of vaccine required was four times that for cattle and in pigs results were very irregular. Successful vaccination is said to protect in from four to eight days and the protection lasts six months. Formol vaccines were found to lose potency after two months storage at 30°C. Toluol vaccines retained potency up to five months and dried vaccines up to six months.

The author emphasizes the danger of a limited virulence of blood used for serum-simultaneous inoculation and recommends that a second injection of virulent blood be given a few days after the first inoculation. [This practice has been adopted in other countries, but it considerably increases the work of inoculation and is difficult to carry out when large scale operations have to be adopted in face of a serious epizootic].—U. F. RICHARDSON.

BOUCHET, A. (1932). Une epizootie de peste porcine. [**An Outbreak of Swine Fever**].—*Bull. Acad. vét. France*. 5. 99-106.

The author describes an outbreak of swine fever which occurred in a fattening establishment and was introduced apparently by newly purchased pigs.

During the subsequent restocking, all pigs were immunized against swine fever by the serum-virus method. The first two consignments were immunized with satisfactory results, but in the next ten lots of pigs, totalling 146, a mortality of 17 per cent. occurred.

In view of the short intervals which elapsed between immunization and the first deaths, and the fact that the majority of the animals were obtained from a district in which swine fever was enzootic, there were good grounds for thinking that some of the animals were in the incubative stage of the disease at the time of inoculation.—T. M. DOYLE.

WAGENER, K. (1932). **Investigations on the Virulence of Vesicular Stomatitis Virus and the Properties of Immune Sera.**—*J. Amer. Vet. Med. Ass.* 81. 160-172. 7 tables. [7 refs.]

After intradermal inoculation into the plantar pads with the virus of vesicular

stomatitis, guinea pigs show local lesions in 48 hours. The virus harvested from the lesions at this stage has, however, already commenced to wane considerably in virulence. It reaches its highest virulence in the epithelium in 24 hours, when no lesions are seen on the pads or only very slight ones. This was shown by means of passive immunity tests upon guinea pigs, which had been injected with graded doses of immune serum and were inoculated intradermally 24 hours afterwards, with virus harvested at 24 and 48 hours from guinea pigs' pads. Two kinds of virus were used, comprising, first, a strain that had been passaged for a long time at 24-hour intervals and, secondly, the same strain which had been passaged, in the ordinary way, at 48-hour intervals. *In vitro* neutralization tests were also performed, to corroborate the above *in vivo* results. It was found that the virus of the 24-hour passages was considerably more virulent than that of the 48-hour passages, judging from the doses of serum required to protect guinea pigs against the development of local lesions. The immune serum, contrary to what is found with that obtained from animals which have recovered from foot and mouth disease, protects not only against generalization, but also against the development of local lesions. If the virus of the 24-hour passages is harvested at 48 hours, instead of at 24 hours, after intradermal inoculation of the guinea pigs, it shows a very marked decrease in virulence and is then hardly more virulent than that obtained at the same interval from guinea pigs inoculated with the 48-hour passage virus. Guinea pigs that show no local lesion, either as the result of an excessive dose of serum in passive immunization, or when they seem to have received a subinfective dose of virus intradermally, are often found afterwards to have acquired an active immunity. This phenomenon is rarely seen in foot and mouth infection in guinea pigs.—J. T. EDWARDS.

SHOPE, R. E. (1932). **Studies on Immunity to Swine Influenza.**—*J. Exp. Med.* **56**, 575-585. 3 tables. [3 refs.]

The author reported in an earlier article [see this *Bulletin*. **2**, 84.] that swine influenza was caused by the combination of a bacterium (*Haemophilus influenzae suis*) and a filtrable virus, neither of these agents alone being capable of inducing the typical disease.

The present paper deals with an immunological study of the two agents. The virus used was a Berkefeld N or V filtrate of lung, bronchial exudate or bronchial lymph gland obtained from an affected pig killed on the third or fourth day of illness. It was shown that the filtrable virus was the primary agent in inducing infection while the *H. influenzae suis* was of only secondary importance.

Although the filtrable virus when inoculated alone gave rise to a mild infection only, it was capable of conferring a solid immunity against the combined action of the bacterium and the virus. The sera of pigs recovered from the filtrate disease neutralized the combined aetiological complex of bacterium and virus.

The virus was found to have a tissue specificity in that it did not induce infection when given intramuscularly and it was constantly infective when introduced into the respiratory tract.—T. M. DOYLE.

I. FINDLAY, G. M. (1932). **The Relation between Dengue and Rift Valley Fever.**—*Trans. Roy. Soc. Trop. Med. Hyg. London*. **26**, 157-160. 1 table. [4 refs.]

II. FINDLAY, G. M. (1932). **The Infectivity of Rift Valley Fever for Monkeys.**—*Ibid.* 161-168. 7 figs., 2 tables. [15 refs.]

I. Monkeys recovered from dengue infection become immune to yellow fever [DINGER & SNIJDERS (1931).] and this immunity resulting from dengue infection

would explain the absence of yellow fever epidemics in the Dutch East Indies. Monkeys recovered from yellow fever, however, have been shown [FINDLAY & DAUBNEY (1931), and FINDLAY (1931).] to be fully susceptible to Rift Valley fever. Dengue infection in monkeys is not accompanied by fever or other signs of illness except, sometimes, a leucopenia on the fifth or sixth day after injection. The infection cannot be passed from monkey to monkey, as with yellow fever and Rift Valley fever, though blood from the monkey is infectious for man [BLANC, CAMINOPETROS, DUMAS & SAENZ (1929).]. With a strain of dengue obtained from SNIJDERS and HOFFMANN of Amsterdam and using human volunteers to act as virus donors and to demonstrate the presence of active dengue virus in the monkeys after inoculation, Findlay showed that three rhesus monkeys, twice inoculated with this virus, at an interval of 14 days, were susceptible to Rift Valley fever infection three weeks later. Three monkeys, twice injected with Rift Valley fever virus at an interval of six months, were shown to become infected, after inoculation 14 days later, with dengue virus. Mice that had been inoculated with dengue virus succumbed to a subsequent inoculation with Rift Valley fever virus. The two viruses were therefore different in cross-immunity tests.

II. Indian monkeys are extremely susceptible to yellow fever infection [STOKES, BAUER, & HUDSON (1928).] while African monkeys show no clinical reaction, but the virus may remain in their blood stream for a few days and cause the formation of specific immune bodies. Rift Valley fever also produces in Indian (rhesus) monkeys a definite fever, focal necrosis of the liver, and, after recovery, immune bodies in the serum. The experiments further recorded by Findlay show that the susceptibility of Old and New World monkeys to these two fevers is roughly parallel. Three species of African monkeys, namely, *Cercopithecus callitrichus* (green guenon), *Cercocebus fuliginosus* (sooty mangabey) and *Erythrocebus patas* (Patas guenon) showed no febrile reaction after inoculation, but the virus was found, by mouse tests, to persist in the blood for a few days, and their sera, which had no protective action before inoculation, developed specific immune bodies. South American monkeys responded rather more decidedly, with febrile reactions; the four species tested comprised *Cebus fatuellus* (brown capuchin monkeys), *C. chrysopus*, *Hapale jacchus* (common marmosets) and *H. penicillata*. —J. T. EDWARDS.

REMLINGER, P., & BAILLY, J. (1932). Contribution à l'étude du virus de la Trinité. [Contribution to the Study of the Trinidad Virus].—*Bull. Acad. Méd. Paris*. 107. 242-253. [11 refs.]

In 1931 the authors obtained from the Lister Institute, London, some virus which was originally isolated from a human case of ascending paralysis in Trinidad and studied it by numerous animal inoculation experiments. Inoculation of the virus subdurally into three rabbits, three dogs, two cats, two guinea pigs, one hawk, four grey rats (rats gris), two white rats, two grey mice (souris gris), two "mérions" and two "gerbilles" caused early death accompanied by generalized paralysis. Two fowls and one pigeon resisted inoculation with the virus.

The authors have no hesitation in proclaiming the virus to be that of rabies: they consider that the cattle disease of Paraguay described by ROSENBUSCH, the Santa Catarina disease of cattle, horses and mules and the bovine and equine disease of the Matto Grosso of Brazil are also types of paralytic rabies.—J. E.

I. —. (1932). Antirabic Vaccination of Dogs in the Army.—*Vet. Bull. U.S. Army*. 26. 100-101. 1 table.

II. WORTHINGTON, J. W. (1932). Rabies and its Control.—*Ibid.* 103-110. [2 refs.]

- III. JONNESCO, D. (1932). Recherches sur la vaccination préventive des chiens avec le virus rabique fixe-chien. [**Researches on the Preventive Inoculation of Dogs with Rabies Virus "Fixed" for the Dog**].—*Ann. Inst. Pasteur*. **49**, 332-342. 3 tables. [7 refs.]
- IV. BALOZET, L. (1932). Les six premiers mois d'application de la vaccination antirabique des animaux à l'Institut Pasteur de Tunis. [**The First Six Months of the Application of the Antirabies Vaccination of Animals at the Pasteur Institute, Tunis**].—*Arch. Inst. Pasteur Tunis*. **21**, 176-180. 2 tables. [1 ref.]

I. During 1931, in eight different army stations, a total of 1,802 dogs were vaccinated. No cases of rabies were reported among dogs having records of annual vaccination. One case of rabies was reported in a stray cat and 15 cases among dogs and cats for which no records of vaccination were available. Reports of vaccination of dogs to the number of 2,871 were received from other stations. Three cases of rabies were reported among stray dogs with no record of having been previously vaccinated.

II. The author is of the opinion that rabies in the United States is definitely controllable. In order to effect this he advocates the annual licensing of all dogs upon satisfactory evidence of antirabies vaccination, the adoption of a suitable method of identification of the licensed dogs, such as tattooing and the systematic collection and elimination of all stray dogs. He refers to the Annual Report for 1930 of the Surgeon-General of the U.S. Army. 4,012 dogs were vaccinated and seven cases of rabies were confirmed. Of the latter, four were stray dogs with no record of previous vaccination. It is suggested that control of rabies at army posts can hardly be complete without a definite plan of eradication upon a large scale.

III. A virus of wolf origin was passaged by intracerebral inoculation through rabbits and dogs. The virus became "fixed" for the rabbit after 22 passages, the incubation period being reduced from 38 days to ten days. From the 13th to the 56th passage in the dog the incubation period remained at ten days, but later decreased to seven days at which it has remained up to the 85th passage.

A vaccine was prepared from the virus "fixed" for the dog by attenuation of a 1.5 per cent. brain emulsion in physiological saline with a 1 per cent. concentration of phenol at 37°C. for several days. The vaccine actually used (three days at 37°C.) was apparently, although it is not very clearly stated, innocuous to dogs by subcutaneous inoculation, innocuous to rabbits by intracerebral inoculation, but still proved to be active, though attenuated, when inoculated intracerebrally into dogs. Five doses of vaccine were given at intervals of 24 hours. From the results obtained, this vaccine would appear to be a good immunizing agent for dogs, the inoculation test being an intrasciatic or intra-ocular inoculation of virus, and superior to a vaccine prepared from "fixed" rabbit virus or "street" virus. The vaccine maintained its antigenic power for a month at 40°C.

It is interesting to note that in passing the virus through dogs the author came across one which proved to be naturally resistant to infection.

IV. Following the example of Morocco and Algeria, Tunis now allows the preventive antirabies vaccination of dogs with certain restrictions. [See decree and information on antirabies vaccination, (1931). *Arch. Inst. Pasteur Tunis*. **20**, 335]. The commencement of the preparation of the vaccine was in October, 1931. Since that date 318 doses have been distributed to veterinary surgeons and certain medical men in Tunis. The vaccine employed is prepared according to the method of Remlinger and Bailly. The brains of rabbits and dogs which have died after inoculation with fixed virus are kept in glycerol until required and attenuation is by treatment with ether for a given number of hours.

Preventive vaccination consists of the inoculation of two doses of vaccine at 24-hour or 48-hour intervals. Vaccination after a bite, called for the sake of convenience "curative" vaccination, consists of three doses at 24-hour intervals. Annual re-vaccination is by the inoculation of virus less attenuated than in the two previous cases. The administration of vaccine usually does not produce other than insignificant untoward results. Vomiting was recorded sometimes or slight symptoms of excitation which appeared some hours after the inoculation and lasted for a short time only. Four cases of death were recorded in vaccinated dogs. Three of these were not due to rabies. The fourth dog died eight days after vaccination, almost certainly of rabies although no autopsy could be made. The history of this case, which came to light subsequently, was that the animal had been bitten by a rabid dog some few weeks before being brought for vaccination and the conclusion was that the dog died of rabies infection contracted prior to treatment. The significance of this observation is amplified by the author.

—I. A. GALLOWAY.

- I. LOCKHART, A., & JOHNSON, S. R. (1932). **Meningo-Cerebral Complications in Canine Distemper.**—*J. Amer. Vet. Med. Ass.* **80**. 745-750.
- II. NICOLLE, C. (1931). La maladie du jeune âge des Chiens est transmissible expérimentalement à l'homme sous forme inapparente. Portée de cette constatation. [**Dog Distemper is experimentally Transmissible to Man in a Latent Form**].—*Arch. Inst. Pasteur Tunis.* **20**. 321-323.

I. The authors observed some degeneration of nerve cells and the occurrence of pseudo-Negri bodies which differed from the true type in that their outline was indistinct and that there was no nuclear staining. "Peculiar bacterial organisms," which were either diplococci or streptococci, were observed in stained preparations of the fluid found in the lateral ventricles.

A similar organism was isolated by Johnson when working on a disease of foxes and it has been recovered from the blood stream in a large majority of affected animals. When injected into suitable animals [the route chosen is not stated] it is capable of producing typical symptoms and lesions of so-called distemper spasms.

A short description is given of the cultural characters of the organism which appears to be pleomorphic.

A bacterin prepared from this organism is stated to induce an immunity to distemper spasms and it is claimed that more than half of the cases recovered when the bacterin was used soon after the onset of symptoms.

II. This is a brief account of an experiment carried out in which the virus of distemper was inoculated into susceptible puppies in doses of 5 c.c. They developed the usual symptoms. Subsequent injection of 5 c.c. of blood from these animals was given one hour after bleeding to a man, a young monkey and a puppy. The puppy developed the characteristic curve of temperature on the fourth day and passage of blood from this animal established the presence of the disease. Neither the man nor the monkey gave any evidence of infection, febrile or otherwise. On the other hand, a dog which received blood from the man taken on the sixth day after inoculation, gave a characteristic temperature curve and the disease was passed to the other dogs.

It is concluded that man may be a carrier of the disease.—G. W. DUNKIN.

- BURGGRAAF, A., & LOURENS, L. F. D. E. (1932). Infectieuse Bulbair-Paralyse (Ziekte van Aujeszky). [**Infectious Bulbar Paralysis, Pseudo-Rabies or Aujeszky's Disease**].—*Tijdschr. Diergeneesk.* **59**. 981-1002. [Summaries in English, French and German : abst. from orig.]

This is an account of an important outbreak of Aujeszky's disease which occurred in February, 1932 in the Bodegraven district, Southern Holland, and is suspected to have originated through the importation of swine fever serum into the country. On the affected farms, the disease was first seen among the pigs, of which about 600 to 700 showed symptoms, usually benign and rather ill-defined, followed mostly by recovery. Later, almost all the cattle kept on these farms became severely ill, and out of 70 cases all save six died. The symptoms were of two types, namely, (a) violent itching about the head, snorting, progressive nervous derangement, and madness; and, (b) nervous symptoms at the outset, stiffness, rigours, perspiration, tympanites, followed by skin itching, which commenced in the region of the chest and withers. There was no fever or paralysis; *post-mortem* examination revealed no lesions. Two dogs, a sheep and a cat also died of the disease, and three horses showed suspicious slight symptoms. Rats were believed to play a part in transmitting the disease; some were seen affected on one farm. The possibilities of food poisoning and bacterial infection were ruled out and examination showed that the disease was not rabies, but that it could be transmitted experimentally by inoculation of brain and other organ material from the affected animals subcutaneously into cattle, goats, pigs, rabbits, guinea pigs and cats, which developed symptoms identical with those recorded by Hungarian and German workers in Aujeszky's disease. Mice and rats could not be infected by subcutaneous or intraperitoneal inoculation. The virus could not be shown to be a filter-passer. All attempts to infect by ingestion failed, as did also attempts to transmit the disease by close contact or co-habitation. A Hungarian strain of virus obtained from AUJESZKY and another from SHOPE, who has studied (1931) what seems to be the same disease, which occurs under the name "mad itch" in small outbreaks in U.S.A., set up the same train of symptoms as the Dutch strain in inoculated rabbits.—J. T. EDWARDS.

PERES. (1932). La mucodermite pustuleuse contagieuse du mouton. [**Contagious Pustular Dermatitis of Sheep**].—*Bull. Soc. Sci. vét. Lyon*. **35**. 66-68.

This communication contains a brief description of lesions encountered in an outbreak involving 80 ewes and 25 lambs. On account of the heavy losses which are experienced in this disease it is important to distinguish it from foot and mouth disease. The presence of cutaneous lesions, the characteristic pearl-like lesions on the teats and the absence of lameness assist diagnosis. In foot and mouth disease in sheep lameness is constant, mouth lesions are small and rare, and skin lesions are absent.

Young animals can be vaccinated with a suspension of powdered scabs in 50 per cent. glycerol. This is done by scarification in the inguinal region. It is claimed that immunity will last one year.—GWILYM O. DAVIES.

- I. HUDSON, C. B., & BEAUDETTE, F. R. (1932). **The Susceptibility of Pheasants and a Pheasant Bantam Cross to the Virus of Infectious Bronchitis**.—*Cornell Vet.* **22**. 70-74. [4 refs.]
 - II. KOMAROV, A., & BEAUDETTE, F. R. (1932). **Some Observations on the Distribution of Virus in the Body of Birds affected with Infectious Bronchitis with Special Reference to the Carrier State**.—*Poultry Sci.* **10**. 391. [Paper presented at 23rd Annual Meeting of the Poultry Science Association.] [Abst. from summary.]
- I. Hudson and Beaudette carried out experiments with the object of modifying the virus of infectious bronchitis (infectious laryngotracheitis) by passage through some susceptible species of bird other than the fowl. In an outbreak of infectious

bronchitis reported by KERNOHAN he observed that virus obtained from pheasants did not induce infection in fowls and pigeons.

Hudson and Beaudette set up the disease in a pheasant-bantam cross and with material from the trachea of this bird successfully infected two young chicks and a pheasant.

They proved also that a pheasant was susceptible to the virus of fowl origin and that passage of the virus through a pheasant did not affect its virulence for chicks.

II. Komarov and Beaudette examined 58 fowls and failed to demonstrate the virus of infectious bronchitis in the liver, spleen, kidney, ovary or peripheral blood. The material used was taken during the incubation period, at the height of the disease and after death.

Three fowls out of a group of 25, which had been affected with infectious bronchitis 16 months earlier, were proved to be still carrying the virus. [? in the respiratory tract].—T. M. DOYLE.

LEVADITI, C., RAVAUT, P., SCHOEN, R., & VAISMAN, A. (1932). Réceptivité du Chat à l'égard du virus lymphogranulomateux de la maladie de Nicolas et Favre. [**Susceptibility of the Cat to the Virus of Lymphogranuloma Inguinale**].—*C. R. Soc. Biol. Paris*. **110**, 1218-1220. [2 refs.]

A kitten inoculated intracerebrally with infected monkey brain remained apparently in good health, but when it was killed, on the ninth day, severe inflammatory changes in the meninges were found on histological examination of the brain, with infiltration of polymorphonuclear cells, lymphocytes and some plasma cells. Inoculation of the diseased tissue from the kitten intracerebrally into a monkey produced the characteristic fatal disease in this animal. A second cat inoculated intracerebrally developed distinct nervous symptoms on the 12th day and died on the 15th day after inoculation, with characteristic meningeal lesions. [This human disease, lymphogranuloma inguinale, as is evident from the recent work of G. M. FINDLAY, (1932). *Lancet*. **223**, 11.—is almost certainly identical with the condition referred to in this country as "climatic bubo." It is due to a filtrable virus and can be transmitted by inoculation intracerebrally into monkeys and mice, resulting usually in a fatal nervous infection, with characteristic meningeal lesions, and also by inoculation into the groin of guinea pigs, which is followed by the appearance of "buboes" in the inguinal glands].—J. T. EDWARDS.

DURAND, P., & CONSEIL, E. (1932). Intradermo-réactions à la variole, à la vaccine et à la varicelle. [**Intradermal Reactions to Smallpox, Cow Pox and Chickenpox**].—*Arch. Inst. Pasteur Tunis*. **21**, 73-87. 1 table.

A description is given of the preparation from smallpox or cow pox material of an antigen which produces intradermal reactions of a definite type. The reagent was obtained by mixing the vesicular fluid of variola or of vaccinia with an equal quantity of glycerol and heating to 60°C. for one hour.

It is stated that, in susceptible subjects, a negative response is obtained, i.e. a reaction of the Dick type, measuring from 6 to 12 mm. and reaching its maximum development at the 24th hour, while immune subjects show a positive reaction in the form of a painful oedematous swelling attaining a size of from 40 to 50 mm. and commencing at the 5th hour after inoculation.

A similar antigen prepared from chickenpox material gave uncertain results in the attempted detection of immunity or susceptibility to this disease.

—R. E. GLOVER.

PINKERTON, H., & HASS, G. M. (1932). **Spotted Fever. I. Intranuclear Rickettsiae in Spotted Fever studied in Tissue Culture.**—*J. Exp. Med.* 56. 151-156. 1 plate. [10 refs.]

By following the same technique as with typhus fever, the authors have successfully cultivated the rickettsiae of spotted fever. The following contrasts are worthy of note :—(1) typhus rickettsiae distend the cytoplasm of the culture cells, but not the nuclei. It is the nucleus which becomes packed in spotted fever cultures, the cytoplasm being only sparsely invaded and (2) spotted fever rickettsiae occur in the phagocytic cells ; in typhus cultures this never occurs.

This is the first description of intranuclear parasitism in mammalian cells by organisms ; it seems possible that some of the so-called " inclusion bodies " may be of a similar nature.—NORMAN HOLE.

INVERTEBRATE VECTORS OF DISEASE.

LEWIS, E. A. (1932). **Some Tick Investigations in Kenya Colony.**—*Parasitology.* 24. 175-182. 5 tables. [11 refs.]

The writer gives preliminary observations on the life histories of some species of ticks found in Kenya with brief notes on the distribution of the species in nature.

Rhipicephalus appendiculatus is noted as a general feeder on cattle and all domestic animals as well as on game and wild animals.

R. pulchellus larvae could not be fed on cattle or sheep, but on the hare (*Lepus capensis crawshayi*). It is a three host tick, the life cycle taking a minimum of 151 days. The small percentage of larvae that fed to repletion indicates that this host is not the normal one in nature. Specimens are recorded from all the domestic animals, but more commonly from game. This tick is distributed throughout the hotter regions of Kenya.

R. simus is very widely distributed in Kenya, specimens having been taken from sea level to 11,000 feet. It is a three host tick and on the hare the life cycle was completed in 142 days. It is frequently found on rats. Hosts include jackals, dogs, sheep, cattle, hares and other wild animals.

Hyalomma aegyptium is frequent in Kenya, having numerous hosts and ranging from sea level to 8,500 feet. The life cycle on calves, sheep and chickens requires three hosts, but on hares only two hosts, the minimum duration of the life cycle on the latter being 138 days. The hare is regarded as a natural host for the earlier stages, but adults have been taken on cattle, sheep, goats, ostriches and numerous wild animals.

Haemaphysalis aciculifer has been taken on wild animals and once on a goat. The minimum time for life cycle is 127 days, acting as a three host tick on hares. It is usually found at about 7,500 feet.

Amblyomma variegatum is common in Kenya and widely distributed from sea level to 8,500 feet.

It transmits " heartwater " in the adult stage. Its life cycle was experimentally completed as a three host tick on hares, chickens and sheep in 281 days. Hosts include cattle, sheep, goats, eland etc., nymphs and adults being commonly found on domestic stock.—J. S. STEWARD.

NÁJERA, L. (1932). Los vegetales insectívoros y la tripanosomiasis. [**Insectivorous Plants and Trypanosomiasis**].—*Med. Paises cal.* 5. 254-255.

The plant *Melinis minutiflora*, a native of Fernando Po, is known to be markedly insectivorous and to exercise a special affinity for the genus *Glossina*. At present

the plant grows in an area representing about one-tenth of that of the island. The author recognizes the impracticability of conducting experiments over the whole island, but suggests that the plant should be grown around habitations occupied by white men and by natives who are compelled to remain in heavily infested areas.—R. S. ROBERTS.

DISEASES CAUSED BY METAZOAN PARASITES.

- I. HEARLE, E. (1932). **Warble Flies and their Control in Canada.**—*Dept. Agric. Canada. Pamphlet. No. 147.* pp. 11. 4 figs. [1 ref.]
- II. DAVIES, W. M., & JONES, E. (1932). **Extension Work on the Control of Warble Flies.**—*J. Min. Agric. London. 39.* 805-813. 3 tables. [5 refs.]

I. The writer gives a popular account of the warble flies of Canada, their life history and their economic importance. Methods of control are given and the standard derris soap wash [derris powder 1 lb., soft soap $\frac{1}{4}$ lb. and water 1 gallon] is recommended. On account of the larvae occurring under the skin of the back as early as the beginning of January, it is recommended that the first dressing be applied about February 11th, then two dressings at intervals of 28 days followed by two more after intervals of 35 days.

When weather conditions are severe, washes may be replaced by dusting the backs of the cattle with finely powdered derris or a 2 per cent. nicotine sulphate dust with a basis of finely powdered lime (though Tripoli earth is preferable as a basis). Not more than 3 oz. of the powder should be applied to one animal.

The writer mentions the success attending the legislation enforcing warble control in Denmark where complete eradication may be expected through continuance of the control measures employed.

II. The authors, using the same derris soap wash, give the results of their experiments in areas representing various types of districts—peninsula, inland valley, upland plateau and lowland district. Within one to two years the percentage of infestation was reduced from 90 per cent. to between 15 and 24 per cent. The average number of warbles per animal before treatment was between 11 and 16 and this was reduced to between 0.5 and 1.1 per animal. Untreated cattle near the border of treated areas acted as controls, 90 per cent. remaining infested, the average number of warbles varying from 11 to 12 per animal.

Derris powder was tested by application in the dry state to the backs of 36 cattle and it resulted in an average kill of 95 per cent. of the warbles. Cube root powder, which has a higher rotenone content than derris, was tested as a possibly more economical substitute for derris. At a strength of $\frac{1}{4}$ lb. cube root to a gallon of water, a 95 per cent. kill was obtained under special conditions, but under farm conditions the results were variable. Used at the same strength as derris powder (1 lb. to the gallon) it proved equally effective, but at this strength there would be no saving in cost.

The authors comment on the disinclination of the warble fly to migrate or cross natural boundaries and on the importance of this in warble control.

—J. S. STEWARD.

- McCULLOCH, R. N. (1932). **Jetting for the Reduction of Sheep Blowfly Attack. The Value of Certain Insoluble Arsenicals and Other Mixtures.**—*Agric. Gaz. New South Wales. 43.* 565-573. 4 tables, 3 charts.

The author gives the results of experiments covering some thousands of sheep. The sheep were jetted in long races at ground level, the operator being in

the race with the sheep. Extreme care was taken to deliver the jet upwardly in the crutch with the nozzle held within two to three inches of the fleece so as to "bubble" the liquid through the wool from the skin. For sheep which had been crutched a pressure of from 150 to 170 lb. per square inch was used and for sheep with full length wool a pressure of from 180 to 200 lb.

Calcium arsenite gave a somewhat greater degree of protection than sodium arsenite solution or the proprietary sheep dip used; in one experiment Paris green at a strength of 10 lb. per 100 gallons of water plus 4 lb. soap gave results comparable to calcium arsenite suspension which was prepared by boiling together white arsenic 10 lb., stone lime 10 lb. and caustic soda 1 lb. per 100 gallons of water.

The addition of soap or dilute caustic soda as a wetting agent in the mixtures reduced the danger of untreated patches occurring in a jetted area. The addition of kaolin did not improve the efficiency of the sodium arsenite solution.

Sodium-silico-fluoride solution and melaleuca oil in emulsion and certain proprietary fluids or dips were less effective than the arsenicals.

The soapy solution and calcium arsenite mixture would suffice for three sheep per gallon, but the sheep dip fluid would only cover two and a half sheep when perfect saturation was achieved.—J. S. STEWARD.

COWAN, F. A. (1932). **A Study of Fertility in the Blowfly, *Phormia regina* Meigen.**—*Ohio J. Sci.* **32**, 389-392. [8 refs.]

The writer found that sperms were regularly present in the males of *Phormia regina* by the third day and were produced throughout their life. Fertility in the male was not affected by the length of larval feeding or by the absence of protein from the diet of the adult.

The sperms remained alive in females for at least 11 days after copulation.
—J. S. STEWARD.

I. AUBERTOT. (1932). Origine proventriculaire et évacuation continue de la membrane péritrophique chez les larves d'*Eristalis tenax*. [**The Proventricular Origin and Continuous Evacuation of the Peritrophic Membrane in the Larvae of *Eristalis tenax***].—*C. R. Soc. Biol. Paris*, **111**, 743-745. 1 fig.

II. AUBERTOT. (1932). Les sacs péritrophiques des larves d'*Aeschna* (Odonates Anisoptères); leur évacuation périodique. [**The Peritrophic Sacs of the Larvae of *Aeschna* (Odonata anisoptera); their Periodic Evacuation**].—*Ibid.* 746-748. 1 fig.

I. The author concludes from numerous dissections that the peritrophic membrane in the larvae of *Eristalis tenax* is secreted by the proventricular wall. Its production is continuous as is also its evacuation *via* the anus.

II. In the larvae of *Aeschna*, which are not provided with a proventriculus, the peritrophic membrane is formed by deposition over the whole of the intestinal epithelium. It is eliminated periodically *via* the anus and its production and rejection take place even in the absence of all food.—J. S. STEWARD.

I. BOYD, M. F. (1932). **A Note on the Preparation of Anopheline Dissections for Examination.**—*Amer. J. Hyg.* **16**, 835-838.

II. BOYD, M. F. (1932). **Methods for the Manipulation and Conservation of Anopheline Imagines.**—*Ibid.* 839-844. 3 figs.

I. The author gives details of successful methods of staining and mounting the stomachs and salivary glands of anopheline mosquitoes. The dissected stomach

is placed in saline under a coverslip, fixed in Bouin's fixative for five minutes and then rinsed rapidly in distilled water and left immersed until all traces of picric acid are removed. It is then stained for one hour in a 1 : 10 dilution of Meyer's acid haemalum and washed in tap water until blue. It is dehydrated in 50, 70 and 95 per cent. and absolute alcohol, remaining five minutes in each. Finally it is cleared in carbol-xylol and mounted in balsam.

By this method, stomach infections with malarial parasites could be detected earlier than in fresh preparations.

Permanent preparations of the salivary glands are made by allowing the glands to dry on a slide or coverslip and staining with Wright's stain as for blood films.

II. The writer gives a full description of his apparatus and technique, for details of which the reader should consult the original.—J. S. STEWARD.

- (1932). **Proceedings of the Helminthological Society of Washington—One Hundred Fortieth to One Hundred Forty-Third Meetings.**—*J. Parasitol.* **18**, 803-811.

The following observations of veterinary interest are recorded in these proceedings :—

E. B. CRAM reported the finding of *Dispharynx spiralis* in the sparrow, in the American robin and in the catbird, new host records for this parasite of the domestic fowl. *D. spiralis* has been successfully transmitted from the bobwhite quail to the domestic pigeon and from the pigeon to the guinea fowl.

G. DIKMANS reported the finding of *Nematodirella longispiculata* in the moose. This parasite was first found in the reindeer in Russia.

R. JAY gave a short account of the remarkable success achieved in the control of fascioliasis in California. Work was begun three years ago, sheep being treated with carbon tetrachloride and breeding places of the intermediate hosts dressed with copper sulphate throughout the whole state. As a source of loss, flukes are now under control.

C. W. REES reported the transmission of anaplasmosis by the tick *Dermacentor variabilis*, both by nymphs which had fed on infected animals as larvae and by adults which had fed on infected animals as nymphs. Transmission of anaplasmosis was also successfully demonstrated in *Rhipicephalus sanguineus*. The incubation period was observed to be 34 days in the susceptible bovines used.

E. E. WEHR gave a short account of the experimental infection of the rabbit with *Gastrophilus intestinalis*. Altogether, 300 eggs were placed on the rabbit's tongue and 13 days after the first feed the rabbit was killed and search made for the larvae. None was found except beneath the mucous membrane of the tongue where there was a large number. Similar larvae were later found under the mucous membrane of the tongue of a horse.

In a later experiment, freshly hatched larvae were dropped daily on to the tongue of a horse over a period of about 70 days, the horse was afterwards killed and a search made for larvae. Large numbers were found under the mucous membrane of the tongue, one larva on the surface near the pharynx, one attached to the mucous membrane lining the oesophagus and 713 in the oesophageal portion of the stomach.

M. C. HALL reported an observation on the value of kamala in removing *Diphyllbothrium cordiceps* from the pelican. Six birds received a dose of 4 g. each, two worms were expelled and on *post-mortem* examination it was found that none had been left behind.

M. C. HALL presented a note at a later meeting in which it was pointed out

that the system of giving only a number or a letter as followed by many authors to designate a new species of cercaria is a bad system, and it was suggested that greater simplicity would result from all authors using the binomial system.

B. G. CHITWOOD reported the occurrence of *Uncinaria stenocephala* in *Mustela* sp., the first time it has been found in a member of the genus *Mustela*.

Myrna JONES presented some further notes on intermediate hosts of poultry tapeworms. Cysticercoids of *Raillietina magninimida*, a tapeworm of guinea fowl, were found in the beetles *Aphodius granarius* and *Amara fallax*. Cysticercoids of *Raillietina cesticillus* were found in the beetles *Stenolophus conjunctus* and *Stenocellus debilipes*, *Stenocellus rupestris*, *Aphodius* sp., *Tenebrio* sp. and *Harpalus nitidulus*. Natural infection of *Hymenolepis carioca* was also found in *Aphodius granarius* and *Choeridium histoides*.—E. L. TAYLOR.

- I. BHALERAO, G. D. (1932). **A General Account of the Helminth Parasites affecting Domestic Animals in India, with Methods of Collection, Preservation, Staining, etc.**—*Ind. J. Vet. Sci. & Anim. Husb.* 11. 1-28.
- II. BLACKIE, W. K. (1932). **A Helminthological Survey of Southern Rhodesia.**—*London School Hyg. & Trop. Med. Mem. Ser.* No. 5. pp. vi + 91. 19 figs. on 7 plates, 29 tables. [numerous refs.]

I. This paper gives a very general account of the orders Trematoda, Cestoda and Nematoda and of the best methods of collection, examination and preservation of specimens. [The systematic subdivision of the orders is not dealt with and, contrary to the suggestion of the title, the paper makes no reference to genera or species occurring in India or in domestic animals].

II. This report of an extensive survey of the indigenous and non-indigenous native population and of the European population of Southern Rhodesia contains a point of veterinary interest in connection with the schistosome species *Schistosoma mattheei*. This species was first described by VEGLIA and LE ROUX (1929) in sheep and cattle in South Africa and during the course of the present survey the author has found it to be of common occurrence in man, located in the uro-genital organs, and particularly in the walls of the bladder, the eggs appearing in the urine and not in the faeces as they do in sheep and cattle. 11.3 per cent. of the sheep and 30.8 per cent. of the cattle examined in Southern Rhodesia were also found to be infected with *S. mattheei*.

[A recent paper by MACHATTIE and CHADWICK has thrown some doubt on the validity of this species—see this *Bulletin*. 3. 254. A comparison of Blackie's figures of the eggs of *S. haematobium* and *S. mattheei* with MACHATTIE and CHADWICK's figures of the eggs of *S. bovis* and *S. mattheei* certainly suggests that the shape of the egg is of doubtful value in the differentiation of the species].

Blackie also reports on the examination for *Trichinella spiralis* of material from the diaphragms of 95 pigs. The negative findings led him to conclude that trichinosis is probably non-existent in Southern Rhodesia.—E. L. TAYLOR.

- PENSO, G. (1932). Présence des oeufs d'oxyures en pleine muqueuse intestinale et biologie des oxyures. [The Presence of the Eggs of *Oxyuris* in the Intestinal Mucosa and the Biology of *Oxyuris*].—*Ann. Parasitol.* 10. 271-275. 6 figs. on 1 plate. [6 refs.]

It was observed that after fecundation the females of *Oxyuris ambigua* penetrate the mucosa of the intestine of the hare and lay their eggs there. The author then turned his attention to infestations of *O. vermicularis* in man; material was difficult to obtain, but he was able to find a female and groups of the eggs in the mucosa of the human appendix. He concludes that this worm is able to complete its life

cycle in the one host and that it is not necessary for the eggs to pass out, thus explaining the persistent nature of infestations with this species.—E. L. TAYLOR.

- I. STUMBERG, J. E. (1932). **Cutaneous Retention of Infective Larvae of the Dog Hookworm *Ancylostoma caninum*, and the Inflammatory Reaction to Skin Penetration.**—*Amer. J. Hyg.* **15**. 186-205. 13 figs. on 2 plates, 6 tables. [18 refs.]
- II. FOSTER, A. O., & CORT, W. W. (1932). **The Effect of a Deficient Diet on the Susceptibility of Dogs and Cats to Non-Specific Strains of Hookworms.**—*Ibid.* **16**. 582-601. 4 tables. [10 refs.]
- III. CBOUZEL, E. (1932). De l'action de l'anlylostome sur les animaux domestiques. [The Action of the Hookworm on Domestic Animals].—*Rev. Path. comp.* **32**. 173-174.

I. The author has investigated the reaction of the skin of the mouse and of the dog to penetration by the larvae of *Ancylostoma caninum*. The development of a local acquired immunity as a result of penetration could not be demonstrated and attempts to bring about the retention of larvae in the skin by passively immunizing with antisera gave inconclusive results. Observations on the effect of subcutaneous injections of an extract of the larvae suggest, however, that the retention of the penetrating larvae is to a certain extent thereby induced.

A histological study was also made of the skin of experimental animals and it was noted that penetration by the larvae resulted in intense proliferation of fibrocytes in the dermis; in no instance was a general round-cell infiltration observed and it is concluded that the reactions are to be interpreted as the result of tissue injury and not as immunity responses.

II. This paper gives an account of further studies on the effect of dietary deficiency in lowering the resistance of relatively immune animals to infection with the hookworm *A. caninum*.

It has previously been shown that age resistance can be broken down by feeding on a diet deficient in vitamins and minerals and the experiments here reported were arranged to ascertain whether resistance to a non-specific strain of hookworm could be lowered in the same way. Scott's two strains Do and Cl, highly infective for the dog and cat respectively, but only slightly infective for the alternative host, were used in the normally non-susceptible animal and it was found that comparatively heavy infestations could be produced, even in adults having a marked resistance to hookworms of their own specific strain, when feeding on a deficient diet had been continued for some time. Young animals susceptible to hookworm infection were used as controls and it was shown that they became only lightly infected with the non-specific strain.

Endeavours were also made by feeding on a deficient diet, to render the dog susceptible to *Necator americanus*, but without success.

III. The author describes acute symptoms in three cats and the occurrence of death 24 hours after they had partaken of decomposed meat containing hookworms.—E. L. TAYLOR.

- FOSTER, A. O., & DAENGSVANG, S. (1932). **Viability and Rate of Development of the Eggs and Larvae of the Two Physiological Strains of the Dog Hookworm, *Ancylostoma caninum*.**—*J. Parasitol.* **18**. 245-251. 3 tables. [9 refs.]

This work makes an addition to our knowledge of the differences between the two physiological strains of *A. caninum*, first described by SCOTT. Known numbers of the eggs of each strain were incubated at different temperatures on pure agar cultures of *Bact. coli* and it was shown that the percentage hatching of the eggs of

the dog strain is 89 per cent. at 21°C. and 50 per cent. at 31°C. as compared with 28.5 per cent. and 20 per cent. respectively at those temperatures for the cat strain. The percentage of hatched larvae to reach the infective stage at the temperatures of 21°C. and 31°C. was found to be 49 per cent. and 94 per cent. respectively for the dog strain, and 17 per cent. and 30 per cent. respectively for the cat strain.—E. L. TAYLOR.

IMMUNITY.

HUDDLESON, I. F. (1932). **The Diagnosis of Brucella Infection in Animals and Man by Rapid Macroscopic Agglutination.**—*Michigan State Coll. Tech. Bull.* No. 123. pp. 18. 7 figs., 3 tables. [20 refs.]

The author describes two methods of preparing a sensitive antigen for detecting specific agglutinins in the blood serum of animals and man due to infections with *Br. melitensis*, *Br. abortus* and the porcine variety of *Br. abortus*, and also the technique for performing a rapid agglutination test. One method of preparing the antigen depends upon boiling and upon the addition of gelatin while the second requires the addition of neutral ammonium lactate. The proper concentration and sensitiveness of the antigen are determined by preliminary titration with sera of varying titres as judged by the ordinary tube agglutination test. The apparatus required for the test consists of a standard 0.2 c.c. pipette graduated in 0.01 c.c. for delivering the serum, a pipette, standardized so that each drop measures 0.03 c.c., for the antigen and a glass plate divided into inch squares and dark field illumination box upon which the test is carried out. Amounts of serum to give final dilutions of 1:25, 1:50, 1:100, 1:200 and 1:500 are placed in single rows and then one drop of antigen is added and mixed with the serum. The plate is lifted from its position on the box and slowly tilted backwards and forwards for three minutes, when readings are taken over the dark background.

The advantages claimed by the author for the rapid test are :—(a) that it may be used with the same degree of accuracy as the tube method ; (b) that whole blood may be used ; (c) that it furnishes quick results in the case of cattle purchased at sales designed for abortion-free herds, also in the case of cattle purchased for inter-state shipment where a delay of two or three days involves considerable financial loss and (d) that it can be used by practising veterinarians in the field.

—S. J. EDWARDS.

NILSSON, K. S. (1932). Något om sänkningsreaktionen hos häst. [**Concerning Red Blood Corpuscle Sedimentation in the Horse**].—*Svensk. Vet.-tidskr.* 37. 252-256. 1 fig.

During the last year the author has examined blood from hundreds of both sick and healthy horses to determine the rate of blood corpuscle sedimentation. He finds that sedimentation is remarkably rapid in the horse and gives the rates for the other domestic animals in the following order :—swine, dogs, cats and cattle. [Sedimentation is rapid in the blood of the Indian domestic buffalo.—ED.] Rapid sedimentation depends upon the aggregation of the corpuscles and the formation of rouleaux, which in turn depend upon the globulin and fibrinogen content of the plasma. The quantity of cholesterin and lecithin present is of no importance while lipoids retard the process.

In the experiments, coagulation was prevented by the use of citrate solution and tubes longer than those used for human blood were employed. The results were read every five minutes for the first hour, and finally at the end of 24 hours.

Sedimentation in horse blood is finished in an hour. No constant difference in rate between blood from sick or healthy horses, or from animals of different sexes could be demonstrated, such as is shown in human blood, nor could any constant rate of sedimentation be shown for any specific disease. The height of the corpuscle column after 24 hours is found to be in direct proportion to the volume of erythrocytes and a correlation between volume and numbers, checked by count, could almost be established.

As a quick and efficient substitute for blood counts the author considers that the sedimentation test is sufficient for all practical purposes and, as the leucocytes form a layer above the erythrocytes, the result may be easily read from a graduated tube.

The influence of body movements on the numbers of erythrocytes is considerable. In both sick and healthy horses, which had been standing for one or two weeks without exercise, an increase of between one and two million erythrocytes, after five minutes walking, could be demonstrated in jugular blood. After 15 minutes walking they decreased in numbers, but never became so low as before. Horses which had been without exercise the longest showed the greatest increase. The number of leucocytes showed very little difference.—A. A. FORSYTH.

MUDD, S. (1932). **A Hypothetical Mechanism of Antibody Formation.**—*J. Immunol.* **23**. 423-427. [13 refs.]

After postulating that antibodies are modified serum globulins, the author states that it is highly probable that they are formed by synthesis from simple units. As this synthesis takes place in the presence of antigen some of the simpler units, e.g. peptides, will be combined, either stoichiometrically or by adsorption, with the antigen, further synthesis occurring only if it conforms to the spatial and chemical requirements of the interface in which the synthesis is proceeding.

This hypothesis is furthered by showing how spatial and chemical characteristics of peptides may determine their combination with enzymes; it is suggested that a similar correspondence between antigen on the one hand, and peptides and amino acids undergoing synthesis on the other, may determine the specificity of the antibody elaborated.

The dissociation of this antigen-antibody complex is presumed, with liberation of the antigen and further synthesis of antibody.—EDWARD F. PECK.

KIRCHNER, O. (1932). Besitzen Tuberkulose- und Nichttuberkulosesera ein bakterizides Vermögen gegenüber dem Tuberkelbazillus? [**Do Tuberculous and Non-Tuberculous Sera possess a Bactericidal Property against the Tubercle Bacillus?**]*—Zschr. Immun.-Forsch.* **74**. 56-77. 2 tables. [12 refs.]

Although variations were observed, no significant difference in bactericidal power for tubercle bacilli was found between 32 tuberculous sera and 20 normal sera. The serum itself or dilutions of it served as medium; undiluted serum or serum diluted with peptone water or broth proved a bad medium, whilst serum diluted to from 3 to 50 per cent. (best 10 per cent.) with Locke's solution proved a notably good medium even for very small numbers of tubercle bacilli.

—A. W. STABLEFORTH.

PETRIE, G. F., & MORGAN, W. T. J. (1932). **The Curative Action of Anti-Pneumococcus Serum (Type I) in Mice.**—*Brit. J. Exp. Path.* **13**. 96-108. 8 tables. [10 refs.]

In a further series of carefully planned experiments the authors have studied the curative action of various doses of natural or concentrated Type I antipneumo-

coccus serum on small groups of mice injected from 7 to 19 hours previously with 10^{-7} c.c. (about 50 diplococci) of a virulent Type 1 culture which killed 93 per cent. of control mice with a mean death time of 45 hours [see this *Bulletin*. 3. 63].

The course of the infection in control mice and in those given antiserum was studied by killing groups of two or three mice at various intervals after infection or serum treatment and obtaining an estimate of the numbers of organisms present in peritoneal exudate or heart blood by transfer of a small and approximately constant quantity to agar slopes for subsequent colony count, as well as by determinations of mortality.

Workers interested in the details of the results should consult the original.

The main conclusions are that a single dose of serum given intravenously up to 12 hours after infection is able to effect a cure even when a bacteraemia is present; that the dose which is adequate at 12 hours must be increased about 100 times in order to be effective at 15 hours, and that the curative dose of the serum at a particular stage of the infective process can be determined by giving graduated doses to groups of mice and noting the dose that gives a 50 per cent. survival rate. Whilst not doubting the importance of the phagocytic mechanism in the clearing process, the authors note that it is less apparent than the efficacy of the serum would indicate.—A. W. STABLEFORTH.

SCHELLNER. (1932). Untersuchungen über die Darstellung von Toxinen des *Streptococcus equi*. [Experiments on the Demonstration of Toxin from *Streptococcus equi*].—*Tierärztl. Rdsch.* 38. 645-648.

The strains of *S. equi* used had been recently isolated from stranglers abscesses and were grown in 25 per cent. horse serum broth containing 5 per cent. of peptone. The methods included salting out with ammonium sulphate, with alum, or with copper acetate and soda lye, alcohol precipitation, ultrafiltration and centrifuging for two hours at 15,000 R.P.M. before or after plasmolysis, but in no case was a toxin demonstrated. Tests were made by subcutaneous injection of mice with from 0.1 to 1.0 c.c. of the various products.—A. W. STABLEFORTH.

BRUNE, C., RENAULDON, & GUYON. (1932). Vaccination anticharbonneuse intradermique en un temps. Accidents. [Single-Dose Intradermal Anti-Anthrax Vaccination. Accidents].—*Rev. gén. Méd. vét.* 41. 607-611.

Besredka's method of anti-anthrax vaccination has been practised on a large scale with sheep in certain parts of France. Originally two vaccinations were given, but recently the first and more attenuated vaccine has been omitted and the second and more virulent vaccine only employed. No unfavourable results were obtained until April 1932, since which date a number of deaths, definitely shown to be due to the vaccine, have followed the vaccination. The authors consider that the second vaccine is so near the borderline of pathogenicity that any adverse conditions such as recent shearing or cold which lower the resistance of the animals may render them liable to actual infection. They are, therefore, compelled to conclude that the single vaccine method is unsafe and to advise the return to the method of double inoculation.—NORMAN HOLE.

GENGOU, O. (1932). Contribution à l'étude des antigènes et des anticorps staphylococciques. [Contribution to the Study of Staphylococcal Antigens and Antibodies].—*Ann. Inst. Pasteur.* 48. 135-143. [6 refs.]

The author explains that "bacteriophage" staphylococcal vaccines, i.e. vaccines composed of staphylococci lysed by bacteriophage, do not contain toxin because the bacteriophage dissolves the cocci before they have time to form toxin.

In order to determine whether vaccines free from toxin can stimulate the production of antitoxin, Gengou performed some experiments which showed that the serum of a rabbit injected with formolized microbial emulsion or "bacteriophage" vaccine has no effect on toxin as injection of such mixtures into rabbits caused local lesions and even death of the animals. It has also been shown that antimicrobial serum is not antihæmolytic as is antitoxic serum.

Gengou has tested the effect of bacteriophage on staphylococcal toxin and has found that it does not affect the lytic nor the flocculating properties of toxin.

In order to determine which form of vaccine was most efficacious in protecting against experimental infection, he treated a series of rabbits with the following different vaccines:—(a) formolized saline emulsions of agar cultures; (b) staphylococcal anatoxin; (c) cultures lysed by bacteriophage and filtered; (d) a mixture of equal parts of anatoxin and formolized bacterial emulsions and (e) a mixture of equal parts of anatoxin and bacteriophage.

The rabbits were given ten subcutaneous injections of doses ranging from 1 c.c. to 5 c.c. of each vaccine during one month and then tested by intravenous or subcutaneous injection of two lethal doses of virulent staphylococci. In the vaccinated rabbits tested by intravenous injection of staphylococci only slight immunity was detected. When the test dose was inoculated subcutaneously a more definite degree of resistance was evident. An abscess containing thick pus was formed at the site of injection. Some of the rabbits vaccinated with formolized bacterial emulsion or bacteriophage vaccine died, but those inoculated with anatoxin survived.

Although the author refrains from forming any definite conclusions, he draws attention to the fact that vaccination with anatoxin rendered the animals resistant to bacteraemia.—C. McG.

- I. MONALDI, T. de S. (1932). Recherches sur l'action prémunisante des Bacilles tuberculeux saponinés. [**The Pre-Immunizing Action of Tubercle Bacilli treated with Saponin**].—*C. R. Soc. Biol. Paris*. 110. 792-793. [1 ref.]
- II. MONALDI, T. de S. (1932). Résistance à l'infection tuberculeuse des Cobayes traités par des Bacilles saponinés. [**Resistance of Guinea Pigs to Tuberculous Infection when treated with Saponinized Bacilli**].—*Ibid.* 874-876. [1 ref.]

BELFANI and DESSY have reported that virulent tubercle bacilli, after exposure to saponin for 72 hours in the incubator, not only fail to set up tuberculosis in guinea pigs, but protect a number of them against subsequent inoculation. Following this technique, the author has experimented with both human and bovine saponinized bacilli. He found that tuberculosis and death invariably resulted, not only after test inoculation, but from the vaccine alone. Saponin was found to kill the majority of the bacilli; the incubation period was, therefore, delayed, owing to the size of the dose inoculated.—NORMAN HOLE.

- DEBRÉ, R., LELONG, M., & PICTET. (1932). Sur la sensibilité à la tuberculine des enfants vaccinés au BCG par voie buccale. [**The Tuberculin Response in Children Vaccinated Orally with BCG**].—*Ann. Inst. Pasteur*. 49. 4-40. 6 tables, 5 charts. [3 refs.]

In this report details are given of the cutaneous reactions to tuberculin of two groups of children all of whom were born of tuberculous parents.

Group I was composed of 377 children who were separated from their families immediately after birth and were reared in an environment as free from exposure to infection as possible. Of these, 297 were vaccinated with BCG while 80 served

as controls. The tuberculin tests showed 97 per cent. of reactions in the vaccinated subjects and none in the controls. The number of positive reactions increased with the age of the subjects.

Group II comprised 262 infants who were allowed to remain in infective surroundings for varying periods. In the controls, 134 in number, positive reactions were obtained in 21 instances, while in the vaccinated group 91.7 per cent. reacted. In this group there was a tendency towards an earlier development of the tuberculin response.—R. E. GLOVER.

BOQUET, A. (1932). Sur l'accoutumance du Cheval allergique à la tuberculine et aux corps microbiens. [**Desensitization of the Horse to Tuberculin and to the Bacillary Bodies**].—*C. R. Soc. Biol. Paris*. 110. 1179-1181. 2 graphs. [2 refs.]

In the horse which has been rendered allergic by the intravenous inoculation of BCG, the daily injection of small doses of tuberculin results in a desensitization. This is manifested by a gradual diminution in the thermal reaction although the local response (an oedematous swelling at the site of the inoculation) is not affected. An increased dose of tuberculin, as in the case of cattle, can overcome this tolerance.

On the other hand, the repeated intravenous inoculation of small doses of BCG produces a cumulative effect, the maximum temperature reaction increasing after each injection. Larger doses of BCG act in the same way as small amounts of tuberculin in inducing a state of tolerance.—R. E. GLOVER.

DISEASES, GENERAL.

I. WEBSTER, W. M. (1932). **Bovine Sterility in New Zealand**.—*Austral. Vet. J.* 8. 199-222. 3 tables. [37 refs.]

II. HINDMARSH, W. L. (1932). **Sterility in Dairy Cows**.—*Ibid.* 222-226. 1 table.

I. Careful *post-mortem* examination was made of the genital organs of a large number of "culled" dairy cows. Cervicitis was the most frequent pathological change in the sterile animals. At the same time the collection of breeding records and the clinical examination of cows was begun. The "breeding efficiency index" was used as a measure of breeding efficiency, the total number of recorded matings being divided by the number of cows in the herd, reckoning any barren cow as equivalent to five matings. For many herds it was from 1.2 to 1.25.

Enzootic sterility due to various causes occurs in New Zealand. The most important are phosphorus deficiency and streptococcal cervicitis. Acute pustular vaginitis, granular vaginitis and contagious abortion are not considered to be important causes of sterility.

For the purpose of estimating the importance of mineral balance in the diet, 42 herds, for which reliable records were available, were selected. It is probable that supplemental phosphorous would improve the breeding efficiency and butter-fat production of high producing cows even when grazing on first-class land.

The influence of the bull on breeding efficiency was investigated. A technique was elaborated for the clinical examination of the cow in oestrus and the chemical and microscopic examination of the vaginal fluid and semen. A detailed study was made of the semen of 150 bulls. Almost all of these bulls were examined clinically; and some *post-mortem* examinations were carried out. Cervicitis was common in the cows and was successfully treated by the injection of medicated paste into the cervical canal. The infection is transmitted by the bull, both mechanically and by the bull himself becoming diseased.

II. In the herds in which breeding trouble occurred it was noted that many of the cattle showed vaginal lesions and, in a smaller number, lesions of other parts of the genital tract. Douching is a satisfactory treatment except in chronic cases of metritis and cervicitis and when ovarian abnormalities are present. *Br. abortus* infection is always present in herds in which metritis and cervicitis are the commonest lesions. The bull is a frequent carrier of genital diseases. Another important mode of spread is the unskilled use of douches by the farmer.

The comparison of the percentages of animals which require more than one service is a more accurate index of breeding efficiency than the breeding efficiency index.—GEORGE SLAVIN.

TEUFELBERGER, R. (1932). Aus der Praxis der Bekämpfung ansteckender Rindergeschlechtskrankheiten. [**Practical Results in the Combating of the Genital Diseases of Cattle**].—*Wien. tierärztl. Mschr.* **19**. 673-679.

The author describes the commonest genital diseases of cattle in north-central Austria. Besides contagious abortion and contagious vaginitis, pyogenic infections of the cervix and uterus, transmitted by the bull, are encountered. He also outlines a procedure for the examination of cattle on a farm where any of these diseases has been observed and discusses the value of the common methods of treatment.—J. E.

BULL, L. B., DICKINSON, C. G., & DANN, A. T. (1932). **Enzootic Haematuria (Haematuria Vesicalis) of Cattle in South Australia**.—*Council Sci. & Indust. Res. Australia. Pamphlet.* No. 33. pp. 24. 2 tables. [14 refs.]

This is an account of chronic haematuria in cattle as it occurs in the region of Mount Gambier, South Australia, giving special attention to a survey of the terrain and to chemical analyses of the urine of cows both inside and outside the areas in which the disease occurs. No further light has been thrown on the cause of haematuria as a result of this work, though it will be of great assistance in future research. Contrary to the common report from other countries that, in redwater areas, the soil is low in fertility and rather acid in reaction, the Mount Gambier soil is very fertile and not abnormally acid and, although there are sharp demarcations between redwater pastures and those where the disease is unknown, no significant differences between their soil or herbage have been found.

The main results of detailed urine analyses are given in the pamphlet, but here again no conclusions could be drawn. Dietetic vagaries, in connection with the artificial manuring of pastures, the composition of food supplements and the use of various salt licks all introduce great margins of error into the interpretation of urine analyses. HADWEN'S oxalic acid theory was not supported by the results of the work in Australia.

The variations in the lesions in a few selected cases of chronic haematuria are described and the opinion is expressed that the bladder lesions are due to an irritant constituent in the urine. Clinical signs of the disease do not develop until after three years exposure to the conditions under which the disease develops.—J. E.

I. DEUBEL, (1932). Beobachtungen an Pferden mit enzootischer Hämoglobinämie. [**Observations on Enzootic Equine Haemoglobinaemia**].—*Tierärztl. Rdsch.* **38**. 414-416.

II. —. (1932). La Myoglobininurie du cheval. [**Equine Haemoglobinaemia paralytica**].—*Rev. gén. Méd. vét.* **41**. 203-206.

I. Records observations from Wurtemberg on a type of equine haemoglobinaemia stated to be seldom described in the literature. Fourteen cases were

studied of which only four survived. Therapeutic measures were of little value.

Clinical symptoms were variable, muscular symptoms sometimes developing gradually but sometimes very rapidly. Albuminuria was usually pronounced and frequently associated with dark coloured urine. Clinical variations are illustrated by detailed description of nine cases. Degenerative muscular changes were most pronounced in masseters, heart and tongue. The author could find no evidence for an infectious cause and describes the disease as a degenerative polymyositis of toxic origin—possibly occasioned by moulds on food-stuffs.

II. A short discussion on haemoglobinaemia paralytica, the ground of which has been more fully covered by CARLSTRÖM [see this *Bulletin*. 1. 234].

—H. H. GREEN.

HALL, G. E. (1932). External Temperature as a Factor in the Production of Diarrhea in Young Chickens.—*Poultry Sci.* 11. 250-254. [10 refs.]

The experiments carried out show that diarrhoea can be produced experimentally in baby chickens by exposure to moderate changes in temperature. The gastro-intestinal tract of young chickens is more readily affected by changes in temperature than the respiratory tract. A sudden increase in temperature appears to be as detrimental in its effects as a decrease.

The exposure to a change of temperature was not always fatal, but it caused a serious disturbance in the metabolism, resulting in subnormal developments at the end of ten weeks observation.—NORMAN DOBSON.

DELPY, L. (1932). Epizootie de pneumo-entérite chez le mouton en Perse. [Epizootic of Pneumo-Enteritis in Sheep in Persia].—*Rev. gén. Méd. vét.* 41. 398-407. 3 tables.

DELPY, L. (1932). Epizootie de pneumo-entérite chez le mouton en Perse. [Epizootic of Pneumo-Enteritis in Sheep in Persia].—*Rec. Méd. vét. exot.* 5. 134-141. 3 tables. [This is a *verbatim* reproduction of I].

The author describes an epizootic amongst sheep which differs appreciably from the recognized sheep diseases.

Owing to its insidious nature there are usually no symptoms to attract attention until a few hours before death and this sometimes leads to its being confused with anthrax. According to the *post-mortem* lesions, three clinical types are described, a pneumonic type, a type characterized by intestinal congestion and a third type which presents the classical lesions of haemorrhagic septicaemia.

A cultural examination of the blood of sick animals and of the blood and tissues of freshly dead animals revealed the presence of two organisms, a pasteurella and an unidentified, Gram-negative, occasionally bipolar organism which is stated to be more closely related to the *coli* group than the pasteurella group. Experimentally, these organisms were shown to be pathogenic for sheep both separately and together. In culture they rapidly became avirulent. Guinea pigs and white rats were resistant to cultures direct from sheep, but guinea pigs succumbed to cultures which had been adapted by passage. The blood of sick sheep was virulent for sheep, the incubation period varying from 10 to 15 days.

An immune serum was prepared from sheep and its curative properties were demonstrated on sheep both naturally and artificially infected. Details are also given of the preparation of a formolized vaccine. This was made from a mixture of different strains of the two organisms and was successfully employed in stemming the progress of the disease in a flock of 350 animals in which infection had been present for a month. Losses continued to occur in the untreated control sheep which had been left in contact with the vaccinated animals.—GWILYM O. DAVIES.

- I. SIMMS, B. T., MCCAPES, A. M., & MUTH, O. H. (1932). **Salmon Poisoning : Transmission and Immunization Experiments.**—*J. Amer. Vet. Med. Ass.* **81**, 26-36. 3 tables. [6 refs.]
- II. WITENBERG, G. (1932). **On the Anatomy and Systematic Position of the Causative Agent of So-Called Salmon Poisoning.**—*J. Parasitol.* **18**, 258-263. 2 figs. [16 refs.]

I. The authors here report further investigation into the cause of this very fatal disease of dogs, transmitted by the trematode *Nanophyetus salmincola*, the encysted cercariae of which occur in salmon in some of the western parts of the United States. They succeeded in transmitting the disease by intravenous and subcutaneous injections of blood from infected dogs, as many as 16 subinoculations having been successfully carried out. Intraperitoneal injections of encysted cercariae also produced infection, but the feeding of virulent blood from an infected dog, the injection of blood from a parasitized salmon and the injection of blood from a parasitized racoon (another host for the fluke) were unsuccessful, as also were injections of virulent blood into a rat, a rabbit and a racoon. Efforts to find any organism in the blood of sick dogs were not successful, filtration of virulent blood appeared to remove the causal organism. It is felt, however, that the tests were too few to allow of any definite conclusions being drawn.

Injection of virulent blood along with blood from hyperimmune animals apparently conferred immunity, but much more work requires to be done before the method is likely to be of any practical value. This fluke is the only instance as yet known of a helminth vector of disease.

II. On the basis of the re-examination of the American material at his disposal which showed some of the characters of the trematode *Nanophyetus salmincola* to be much more variable than had been supposed, the author, who communicated on this subject in 1929, concludes that the genus *Nanophyetus* Chapin in HALL (1927) should be regarded as a synonym of *Trogloitrema* Odhner 1914, and that the species found in man and described by SKRJABIN and PODJAPOLSKAJA under the name *Nanophyetus schikhobalowi* is identical with CHAPIN's species.

[With reference to the title of this paper, it should perhaps be pointed out that, although this fluke is closely associated with salmon poisoning, it is no longer regarded as the true causal agent].—E. L. TAYLOR.

- LOCKHART-MUMMERY, J. P. (1932). **Origin of Tumours.**—*Lancet*. **222**, 618-620.
- GYE, W. E. (1932). **The Etiology of Cancer.**—*Brit. Med. J.* Feb. 27th. 395-396.
- (1932). **Discussion on the Comparative Pathology of Tumours.**—*Proc. Roy. Soc. Med. London*. **25**, 591-595. 1 table.

The first paper is a theoretical consideration of the origin of tumours, together with a discussion. The essential difference between a normal cell and a tumour cell is one of behaviour and not of apparent structure. The neoplastic cell grows faster than the normal cell. There are two kinds of cellular reproduction, that which produces a new individual and that which results in the replacement of injured and worn out cells in the tissues. Both germ cells and somatic cells breed true to their parent cells and their breeding is controlled by the genes in the nuclei. Mutations of the genes may occur and following this the daughter cells will always breed true to their mutation. Tumours are the result of a mutation of the genes controlling the division of the somatic cells. The author considers that the acceptance of this theory makes it possible to explain all the different phenomena connected with tumour growth and behaviour. In the discussion that followed LUDFORD stated that the gene was a living concept occupying much the same

position as the atom in physics. Genes are estimated to measure from 20 to 88μ and are assumed to be arranged in linear fashion, many hundreds of them to each chromosome. The number of chromosomes in tumour cells vary considerably.

MOTTRAM pointed out that the mutation theory has arisen from the discovery that X-radiation could produce malignancy. Once a gene is altered it is altered for ever and this rule applies to the cancer cell. The Jensen rat sarcoma remains today exactly as it was when first discovered.

GYE took part in the discussion giving a summary of his well-known views on the causation of cancer referred to in the second paper. He stressed the hypothetical nature of the gene theory, which is not accepted by all biologists. The one feature of cancer which distinguishes it from all other diseases is the autonomous character of growth. A tumour consists of cells entirely derived from the first cell which acquired malignant characters. In addition to a virus as an aetiological agent in producing tumours, another intrinsic factor specific for each host is necessary.

The third paper is a summary of a discussion on the comparative pathology of tumours opened by CRAMER. Cancer is distributed throughout the vertebrate kingdom and exhibits the same fundamental features in animals as it does in man. It arises *de novo* in each individual, begins as a local disease and spreads by metastatic dissemination. It is not contagious and cannot be transmitted from an animal of one species to an animal of another species. The transplantation of tumours, which is restricted to animals of the same species, is not transmission of the disease, but merely an *in vivo* culture of malignant cells. One feature common to cancer in animals and in man is the characteristic age incidence. Cancer in man is a relatively rare disease, 1 case occurring in 1,000 living persons. In children and young adults it is extremely rare and it becomes increasingly frequent as age advances.

No species has so far been found which is free from cancer. The apparent rarity of cancer in many species of domestic animals finds an explanation in the fact that these animals are killed before they have reached the cancer age. There are variations in the different species in certain details relating to cancer, e.g. in sex incidence, type of tumour and organ incidence.

BAKER dealt with the fowl tumours and stated that there was no evidence of infectivity. He then discussed the various types of neoplasms encountered. Although the relationship between the fowl carcinomata and mammalian cancer is, so far, obscure, these tumours demonstrate that a filtrable agent is capable of causing a neoplasm. To this extent they support the possibility of an extrinsic virus as a cause of cancer. SHEATHER mentioned a few types of sarcoma and carcinoma observed by him. INNES stressed the impossibility of making a strict comparison between neoplastic diseases in domestic animals and analogous conditions in man since statistical data of the incidence of the different types of tumours are not available and there are many types of tumours in man which have not been shown to occur in animals [e.g. many of the gliomata]. As the same laws govern the origin and formation of tumours both of the lower animals and man, comparative oncology is a matter of practical importance. A table indicative of types encountered in the domesticated animals is given. The total of 137 cases includes fibromata 17, osteochondromata 4, angiomas 14, sarcomata 15, melanomata 18, adeno-carcinomata 9, squamous cell carcinomata 22, embryonal carcinomata or seminomata (testis of dog) 5. The locations and structural variations of these various types and other tumours of comparative rarity are discussed.

—I. R. M. INNES.

WITTS, L. J. (1932). **The Pathology and Treatment of Anaemia. Lecture I. The Erythron in Health and Disease. Lecture II. The Anhaemopoietic Anaemias. Lecture III. The Haemolytic Anaemias, and Lecture III (contd.) The Haemolytic Anaemia of Pregnancy.**—*Lancet*. 222. 495-500, 549-557, 601-605 and 658-656. 8 figs., 7 tables. [181 refs.]

This is a very complete discussion of the pathology and treatment of anaemia with an extensive bibliography.

It is considered that the term erythron (BOYCOTT) should be used to comprise the red blood cells and the cells from which they arise and thus emphasize the functional unity of the red cells and their precursors. The erythron may, therefore, be aptly compared with an organ, e.g. skin and the same principles of reactions and processes of disease applied to it. Erythrogenesis and erythrolysis are discussed. The capillaries of the marrow have an enormous potential hyperplastic response as well as maintaining circulation. The circulating blood is nearly all mature cells and is as highly specialized and as "dead" as the stratum corneum of the skin. When the delivery of red cells into circulation is increased the percentage of reticulocytes rises and may reach 50 per cent. and conversely the rate falls below the level of normal health when the delivery is diminished. Enumeration of reticulocytes is a valuable means of detecting the rate of blood formation. Hyperplasia of marrow is not synonymous with increased blood formation. The important question whether anaemia is due to diminished blood formation or to increased blood destruction is discussed. The author considers that pernicious anaemia is due to diminished production of red cells or dysplasia of the marrow. From this, anaemias can be classified into (a) those with hypoplastic or aplastic marrow and (b) those with hyperplastic marrow. The latter is subdivided into haemopoietic and anhaemopoietic anaemias.

Splenic anaemia is a rare disease and is the result of raised portal pressure due to primary disease of the liver. Splenomegaly never justifies an immediate diagnosis of splenic anaemia.

The size of the red cells in health and in disease is discussed and the importance of the value of the Price-Jones curve in showing the degree of anisocytosis and thus being a delicate indicator of disease process is stressed.

The author then goes on to a detailed account of the anhaemopoietic anaemias commencing with those which result from nutritional and alimentary disturbances. According to the level at which the haemopoiesis is arrested the marrow may be normoblastic, megaloblastic or aplastic. In particular he deals with achlorhydric anaemia, anaemia following resection of the small intestine and intestinal stenosis and that associated with intestinal parasites, fatty diarrhoea, coeliac disease, sprue, chylous diarrhoea, pellagra and diseases of the thyroid.

The last two papers concern the haemolytic anaemias. Causation and characteristics of this group are discussed. The organism which stands out above all others as a cause of haemolytic anaemia is *Clostridium welchii*. Particular reference is made to acute haemolytic anaemia and the haemolytic anaemia of pregnancy which he considers to be an almost identical disease differing only in the fact of pregnancy.—J. R. M. INNES.

AUCHINACHIE, D. W., & FRASER, A. H. H. (1932). **The Effect of Lime and Cod-Liver Oil on Sheep fed on a Calcium Deficient Ration.**—*J. Agric. Sci. Cambridge*. 22. 560-575. 15 tables, 2 charts. [9 refs.]

Forty seven-month-old half-bred wether hogs were used. These were divided into eight lots of five sheep each. Four lots were kept outdoors and four lots indoors. All the sheep were fed on a basal diet deficient in calcium. The

daily intake of calcium oxide was calculated as 2.7 g. Certain of the groups both outdoors and indoors received supplements of lime, or cod liver oil, or of both. The experiments ran from November to June. The animals indoors, which had been fed on basal diet alone, were nearly dead at the end of the period (one died on the 16th day), they showed a much lessened blood calcium and only a slight increase in blood inorganic phosphorus. Their average gain in weight was 8.3 lb. Those on the basal diet outdoors were in very good condition and had gained 31.4 lb. This was in spite of a low serum calcium. The addition of lime to the diet had no special effect on the outdoor sheep; but those fed indoors were more healthy and alert than those on the basal diet, although they did not gain more in weight. Cod liver oil added to the diet increased the rate of growth, both indoors and outdoors, increased the serum calcium and tended to stabilize the $\text{Ca} \times \text{P}$ product.

It is concluded that a low serum calcium is not incompatible with rapid growth and that the deficiency in growth of the inside group was not due to calcium lack. Both cod liver oil given to the sheep inside, and the feeding of the animals outdoors, gave acceleration in growth when compared with the indoors group on the basal ration alone. This latter contained a sufficient content of carotene and, on the assumption that the ruminant can transform this into vitamin A, the results suggest that the diet was deficient in vitamin D. It is inferred that the efficiency of cod liver oil in stimulating growth is due to its power of improving the utilization of the phosphorus in the diet. Indications showed that this could also be accomplished by summer sunlight, but that winter sunlight was inefficient.

—HENRY DRYERRE.

WERNER, F. (1932). Ein Beitrag zur Rachitis der Jungenten und deren Behandlung. [**Rickets in Ducklings, and its Treatment**].—*Tierärztl. Rdsch.* 38. 54-55.

The author describes the development of rickets in ducklings about six weeks old, on a ration of concentrates supplemented with calcium but inadequate in vitamin D. Adverse hygienic factors were aggravating causes. He advocates inclusion of 1 per cent. of cod liver oil, or minute amounts of vigantol, in the rations of intensively reared ducklings.—H. H. GREEN.

HESS, A. F., & BLACKBERG, S. N. (1932). **An Experimental Study of "the Constitutional Factor" in the Etiology of Rickets.**—*Amer. J. Physiol.* 102. 8-11. 2 figs., 1 table. [3 refs.]

An investigation on the development of rickets in four mongrel puppies from the same litter, two predominantly of a long-haired terrier type and two of short-haired breed.

The Mellanby rickets-producing diet was used, with one control receiving viosterol. From the clinical picture, radiographs, serum Ca and P, the authors claim to have demonstrated experimentally a constitutional tendency to rickets, associated with breed as distinct from diet, hygiene and growth rate.

—H. H. GREEN

PUBLIC HEALTH.

SIMPSON, R. (1932). **Duties of a Whole-Time County Veterinary Officer.**—*Vet. Rec.* 12. 945-950.

[Paper presented to the 43rd Annual Congress of the Royal Sanitary Institute held at Brighton in 1932].

The history of the few county veterinary services now existing in England is given and the more satisfactory position of these services in Scotland is remarked on,

The duties, part of which fall under the Diseases of Animals Acts of the Ministry of Agriculture, and part under the legislation of the Ministry of Health, are described and the tendency to overlapping is pointed out. The formation of a joint committee composed of a like number of members of the Agricultural Committee and of the Public Health and Housing Committee of the County Council, as is done in a few counties, is considered to be the best means of keeping such overlapping to a minimum.

The great advantage, both to the agriculturist and to the public, of a regular inspection of milk cows is stressed and the increased freedom of the milk supply from tuberculosis and even from other infections as the result of such inspections is demonstrated.

The necessity for laboratory work by the veterinarian as an aid to his diagnosis is well shown and the addition of a certain amount of bulk sampling of milk along with the clinical examination of herds is urged.

The paper ends with a hint as to the formation of some form of a general State Veterinary Service looming in the offing, even if not something which may materialize in the near future.—D. S. RABAGLIATI.

- I. MÜLLER, J. (1932). Die Entnahme von Trachealschleim auf oralem Wege beim Rinde. [**The Removal of Tracheal Mucus from Cattle by the Oral Route**].—*Deuts. tierärztl. Wschr.* 40. 438-441. 5 figs. [7 refs.]
- II. FRISCH. (1932). Ein neues Instrument zur Entnahme von Lungen-schleimproben bei Rindern. [**A New Instrument for the Removal of Samples of Lung Mucus from Cattle**].—*Ibid.* 662-663. 2 figs.
- III. KARMANN, P., & PRESCH, L. (1932). Zur Entnahme von Trachealschleim mit der Trachealkanüle. [**On the Removal of Tracheal Mucus with the Tracheal Canula**].—*Ibid.* 663-665. 2 tables. [9 refs.]

I. This paper refers to the older methods of obtaining bronchial mucus from cattle for the diagnosis of tuberculosis, etc. and describes a new technique. A slender metal tube containing a wire provided with a piece of gauze is inserted *per os* and the wire is advanced *via* the trachea into the bronchi where the gauze soaks up mucus: the wire is pulled back into the tube and the whole is withdrawn. The author prefers this bloodless method to the previously recommended technique of approach through a small canula inserted in the trachea in the neck region. The instrument and its employment are well illustrated.

II. The author's instrument is a plain curved tube 46 cm. long with an internal diameter of 15 mm. intended for use by the oral route in a manner similar to that used by MÜLLER. When in position a wire fitted with a swab is passed through the tube down the trachea. He claims that, owing to the large diameter of the tube, very little of the mucus is lost during withdrawal of the wire.

III. This is a discussion on the various modifications of the tracheal canula method of obtaining bronchial mucus from cattle, with special reference to the respective merits of narrow and wide bore canulae. After carrying out tests with both types of instrument on separate lots of cattle, the authors prefer a narrow bore canula with an internal diameter of 5 mm., which was as efficient as the larger size and cheaper to buy.—J. E.

LECLAINCHE, E. (1932). Un concept d'une police sanitaire moderne. [**A Forecast of a Modern Sanitary Police**].—*Bull. Off. internat. Epiz.* 6. 173-182. The author compares the veterinary police measures which have been so

successful in the past in dealing with animal epizootics with what in his view must be the policy of the future. He describes how the old and once greatly to be feared diseases such as cattle plague, sheep pox, contagious pleuro-pneumonia, glanders, rabies, dourine, anthrax, swine erysipelas and foot and mouth disease—with the exception of the last named—have all either disappeared or can be readily kept in check.

He shows how there is now springing up a new and insidious group of diseases which at one time were only found in isolated premises, but are now increasing so rapidly that, if stern measures are not taken, they will soon spread to all parts of civilized countries. Such diseases require a totally different system of veterinary police measures for their control and eradication. He instances tuberculosis in cattle, swine and fowls; swine fever, mammitis of the cow, brucella infections, certain diseases of fowls, Johne's disease and several others.

An essential point in dealing with these diseases is to obtain not only the goodwill of the stockowners, but their active and wholehearted support. The old methods of isolation of affected animals till their death or slaughter, or until the danger of infection from those cured passed away, no longer hold good under new conditions.

The difficulties of accurate diagnosis are discussed and also those of finding healthy stock bred on clean premises for restocking infected farms.

International control is essential and those countries which have thoroughly satisfactory veterinary services with good organization and control will be the best able to meet the demands which quite rightly will become more and more exacting.—D. S. RABAGLIATI.

— (1932). **Committee on Slaughter-house Methods and Equipment.**—*Nature*. **129**. 864.

The British Science Guild has appointed a committee to enquire into improved methods of slaughtering animals for food purposes and to advise local authorities.

The committee consists of 12 members representative of all interested bodies including two members of the veterinary profession.—J. E.

IVY, A., & BARRY, F. (1932). **Studies on the Electrical Stunning of Dogs.**—*Amer. J. Physiol.* **99**. 298-307.

CLARK, G., & TWEED, W. (1932). **The Use of Electricity in the Stunning of Animals.**—*Vet. Rec.* **12**. 177-179.

ANTHONY, D. J. (1932). **Electricity for the Slaughter of Animals.**—*Ibid.* 380-386.

SYMES, W. L., HILL, L., & HOBDAI, F. T. G. (1932). **Electrical Anaesthesia in Slaughter. Reports on the Use of the Electrolethal No. 2 for Humane Slaughter of Pigs and Sheep.**—*Ibid.* 469-471.

ANTHONY, D. J. (1932). **The Use of Electricity for Slaughtering Sheep painlessly.**—*Vet. J.* **88**. 164-167.

The above articles all deal with the use of electricity in the stunning of animals prior to slaughter, only lately in use and, as yet, more or less experimental in Britain. As animals can recover in about three minutes from the effects, there appears to be some doubt as to whether there is entire absence of pain or not. Symes, Hill and Hobday seem to have no doubt on the question. There is more than one type of apparatus of German origin on the market. As yet, the number of animals stunned by this method is small; it appears to be most useful on pigs and up to the present few cattle have been stunned electrically. There has been some discussion as to fractured bones and "splashing" and opinions and experience vary. Further experience is necessary, especially on large animals.

—T. DUNLOP YOUNG.

JOHNSON, S. D., & TRUDEL, F. G. (1932). **Observations on the Significance of Leucocytes in Milk.**—*Cornell Vet.* **22**. 354-366. 19 tables.

This article is a report on the number of leucocytes found in the milk of healthy cows and in those suffering from varying degrees of mastitis. The results are given in extensive tables appended to a brief article.

The author concludes that in general there is, in mastitis, an increase in leucocytes in the milk corresponding to the degree of change found in physical examination of the udder, the changes found in the milk and the bacteriological findings; and further that in mastitis there appears to be an increase in leucocytes that precedes the appearance of streptococci and staphylococci in the milk.

—S. H. GAIGER.

BACHMANN, W. (1932). Ueber den Einfluss der Euterinfektion auf das Zellbild der Milch. [**On the Influence of Udder Infection on the Cell Picture of the Milk**].—*Zschr. Infektkr. Haust.* **42**. 225-296. 2 figs., 5 tables. (23 pages). [33 refs.]

After a discussion of the relevant literature, tabulated summaries are given of the bacterial flora and cell counts in 30 cows and 2 goats, many of which were examined on numerous occasions. Fore milk from individual quarters was used, shake cultures being made in deep serum glucose agar, quantitative cell counts by the method of Prescott and Breed and differential counts on smears of sediment stained by Giemsa's method.

The differential picture was similar in fore milk and strippings, and in smears of milk and of sediment. The correlation between bacterial count and cell count already noted by STECK was confirmed and in samples of a normal character was close. With increase in the numbers of micrococci or streptococci there was, however, a change in the relative proportion of the several types of cell. Comparing samples with a count of over 500 per c.c. with those whose count was 2 or less, the following increases were found:—lymphocytes, 3 times; monocytes, 5 times; neutrophile leucocytes, 7·8 times; gland cells 4·5 times and total cell count 5·7 times. In the ordinary catarrhal streptococcal mastitis there was a marked increase of neutrophile leucocytes; on the other hand, in a case of phlegmonous streptococcal mastitis, and also in a case of tuberculous mastitis, a lymphocytosis was evident.

Overstocking produced by missing a milking during full lactation or occurring in the course of drying off produced at first chiefly an increase in the relative and absolute numbers of neutrophiles, which was the greater as the bacterial irritation was greater. Progressive overstocking soon also caused an increased lymphocytosis and at the same time a monocytosis which finally overtook the lymphocytosis. Increase of cells also occurred in the secretion of quarters with a low bacterial count and the picture became indistinguishable from that of quarters which gave a high count; the count of the latter generally decreased.—A. W. STABLEFORTH.

- I. BLACK, L. A., PROUTY, C. C., & GRAHAM, R. A. (1932). **The Effect of Pasteurization on the Bacterial Flora of Low Count Milk.**—*J. Dairy Sci.* **15**. 99-112. 7 figs., 3 tables. [5 refs.]
- II. RAISTRICK, H. (1932). **Milk Pasteurization.**—*J. Soc. Chem. Indust.* **51**. 88-92. 8 figs.
- III. —. (1932). **Compulsory Pasteurisation of Milk Supplies.**—*Med. Officer.* **47**. 36-37.

I. Twenty samples of mixed milks with low bacterial counts (average 3,467 organisms per c.c.) were pasteurized at 142·5° F. for 30 minutes and subsequently maintained at temperatures of 68° and 45° F. respectively until they spoiled.

At this time a bacteriological examination of the milks was carried out and the organisms found divided into three principal groups :—the acid-producing, the proteolytic, and the alkali-forming and inert. The results indicate that the two latter groups constitute the largest percentage of organisms present so that the acid-producing group does not appear to be of major importance in the spoilage of milks with low initial count. The evidence reported in this paper bearing on the groups of bacteria surviving pasteurization and causing subsequent changes in the milk does not fully agree with the results obtained by other investigators who have usually found the acid group predominant, but it must be remembered that their conclusions were based on milks of relatively high count.

II. The author stresses the advantage gained from the use of pasteurized milk by the avoidance of epidemics caused by milk-borne pathogenic organisms. This advantage outweighs the possibility of destruction of vitamins in the milk, since these can be replaced in the diet of children by more certain sources of vitamins, e.g. orange juice and cod liver oil. The different types of plant used for pasteurization are described.

III. On the recommendation of the Medical Officer of Health, Manchester City Council are to seek parliamentary powers to compel pasteurization of the whole milk supply of the City with the exception of Certified and Grade A tuberculin-tested milk. Special attention is paid to non-pulmonary tuberculosis of children which would be almost completely abolished by pasteurization.

—S. J. EDWARDS.

PANISSET, M. (1932). Les machines à traire et l'hygiène de la traite. [**Milking Machines and the Hygiene of Milking**].—*Rec. Méd. vét.* **108**, 360-363.

A general discussion in which the following points are made. Modern milking machines have no influence on milk-yield as regards quantity or quality. Their value depends therefore on saving of labour and on their effect on the hygienic quality of the milk. In the United States or Canada their employment is not economical in a herd of less than 50 cows ; in France, owing to lower labour costs, they would only be justified by a larger number of animals. Further, the maintenance of a machine, contrary to the opinion expressed by VENDRIES, requires a milking staff of higher standard. Final stripping is to be recommended because the vacuum required to remove the last milk is too high. From the hygienic viewpoint, provided that the tubes and cups are kept in good order—not by any means an easy undertaking—machine milking has the advantage that the milk is protected from outside contamination. Regarding statements that machine milking favours the occurrence of mastitis and its spread, the author observes that if in the case of hand milking it is difficult to ensure that the elementary measures of prophylaxis, such as the milking of infected animals last, are carried out, it will be equally difficult to ensure prophylactic measures in the case of machines, i.e. two sets of cups, kept entirely separate at all stages. In the case of cows affected with mastitis, he favours hand-milking on general grounds, and observes finally : “ In Quebec the greater part of badly infected herds are machine-milked ; a coincidence perhaps, but a provocative one.”—A. W. STABLEFORTH.

THERAPEUTICS.

- I. YORKE, W., & HAWKING, F. (1932). **Studies in Chemotherapy. VII. Is the Resistance of a Drug-Fast Trypanosome modified by Transference to a Different Species of Vertebrate Host?**—*Ann. Trop. Med. & Parasitol.* **26**, 215-237. 7 tables. [15 refs.]

II. YORKE, W. (1932). **Drug Resistance, with Special Reference to Trypanosomiasis.**—*Brit. Med. J.* Oct. 8th. 668-670.

I. The authors subject the earlier papers of MESNIL and BRIMONT, of BREINL and NIERENSTEIN and others, to critical examination, and reinvestigate the whole question of drug resistance in trypanosomiasis.

They found that a strain of *Trypanosoma rhodesiense* made resistant to atoxyl in the mouse continued to manifest its full resistance when passaged through rats; as did also a strain made resistant to tryparsamide in mice when passaged through rabbits; similarly a strain made resistant to tryparsamide in the rabbit manifested complete resistance when transferred to mice. Experiments *in vitro* also indicated that the character of drug resistance was not modified by transference of the trypanosome from one host to another.

The authors are convinced that resistance to the aromatic arsenicals is a stable character inherent in the trypanosomes themselves, and is in no way modified by the particular vertebrate host in which the parasite happens to find itself. They find no evidence to support the hypothesis of BREINL and NIERENSTEIN that resistance is directed against a combination of the drug and of the specific serum of the host in which the strain became resistant. The trypanosome is resistant to the drug itself or, in the case of a pentavalent arsenical, to its corresponding trivalent derivative (formed by reduction in the tissues).

II. A general article based upon the investigational experience of the author. It gives a concise statement of his views and its critical temper should prove stimulating to those interested in the factors which conduce to the production of a drug-resistant infection.—H. H. GREEN.

VAN HOOFF, L. (1932). Essai de deux nouveaux antimoniaux, le Dn 7 et le Dn 9, dans la trypanosomiase humaine. [Trial of Two New Antimonials Dn 7 and Dn 9 in Human Trypanosomiasis].—*Ann. Soc. belge Méd. trop.* 12. 181-198. 2 tables. [3 refs.]

Trials on the human subject of two new antimonials (prepared by Union Chimique Belge) already reported upon by DUBOIS [(1931). *Ann. Soc. belge Méd. trop.* 11. 275.] in respect of laboratory animals infected with *T. pecaui* and *T. congolense*.

Both compounds are derivatives of diethylamine oxyquinoline sulphonate, Dn 7 being described as diethylamine antimonyl dioxyquinoline sulphonate containing 16.7 per cent. of antimony, and Dn 9 as diethylamine oxyquinoline stibio-sulphonate containing 34.4 per cent. of pentavalent antimony. The maximum subcutaneous dose of the former for the white rat is given as 300 mg., and of the latter as 261 mg. per kg.

The present paper reports 12 human cases treated with Dn 7, and 13 cases with Dn 9, some of them previously treated with other chemotherapeutic agents such as tryparsonyl and germanin. The authors conclude :—(a) that both are useful trypanocides, well tolerated intravenously in doses of from 0.25 to 0.50 g. as 5 per cent. aqueous solution; that both associate well with other trypanocides and with bismuth; that injections may be given at intervals of two days or even one day and that no adverse cumulative effects occur up to 8 g. Dn 7 or 6 g. Dn 9, and (b) that Dn 7 is the more efficient and reliable, and is useful even when used at short notice and when other agents are contraindicated or have ceased to be effective.

As additional note a case is reported of an arsenoresistant monkey with *T. gambiense*, resistant to 0.08 g. atoxyl per kg., but permanently cured with 0.02 g. of Dn 7.—H. H. GREEN.

JOHNSTON, J. M. (1932). **A Review of the Pharmacology of Urinary Antiseptics.**—*Lancet*. **222**, 54-55. [5 refs.]

A general article discussing the mechanism of action, real or alleged, of urinary antiseptics. The available evidence does not justify the assumption that benzoates and salicylates have a definite action *per se* but suggests that the known clinical results following the combination of hexamine with ammonium benzoate (or phosphate) depend upon :—(a) diuresis promoting mechanical cleansing ; (b) formation of an acid urine unfavourable to bacterial growth and (c) the inhibitory effect of formaldehyde liberated from the hexamine in acid medium.

—H. H. GREEN.

POISONS AND POISONING.

ROSE, A. L. (1932). **The Toxicity of Carbon Tetrachloride for Sheep and Cattle : A Survey.**—*Austral. Vet. J.* **8**, 122-137. [23 refs.]

The author gives an account of the observations made on 18 Australian properties on which fatalities occurred after drenching with this drug, together with a valuable comparative survey of Australian with English and American reports. The chief points of difference are that in Australian experience, as opposed to that in other countries, hand feeding on concentrates is not a predisposing factor ; that in Australia a very frequent feature is loss of wool of many of the surviving sheep and that the "incubation period" is usually four days. The author believes that inclement weather conditions at the time of dosage may increase the risk of loss, but this is not regarded as the decisive condition, which still remains obscure.—G. D. LANDER.

ADRIANO, F. T., & YNALVEZ, L. (1932). **A Rapid Modified Method of detecting and estimating Hydrocyanic Acid suitable for Field Tests.**—*Philippine J. Agric.* **3**, 105-107. 2 plates (1 coloured), 2 tables. [6 refs.]

The authors describe their modification of Guignard's (1916) method for the quantitative estimation of hydrocyanic acid, which they have elaborated for rapid use in dealing with tubers and roots.

It is an easily read colour test and is illustrated in a plate.—J. E.

SKIDMORE, L. V., & PETERSON, N. F. (1932). **Observations on the Toxicity of Golden Glow (*Rudbeckia laciniata*) to Swine and other Animals.**—*J. Amer. Vet. Med. Ass.* **81**, 655-662. 2 figs. [14 refs.]

Two pigs of about 80 pounds weight each consumed between them during five days 19½ lb. of the whole young plant ground up and mixed with corn feed. No symptoms or untoward effects were noticed. When the more mature plant was similarly fed to swine, after about 4 lb. each the animals showed incoordination of movements, accelerated respiration, abdominal pain, salivation, champing of the jaws and refusal of food and drink. These symptoms persisted for from 24 to 36 hours and thereafter the animals consumed on an average a total of 14 lb. each during 14 days without any ill effect beyond loss of weight.

Somewhat similar observations were made with sheep which, after the preliminary symptoms, appeared also to acquire tolerance.

Rabbits and guinea pigs were similarly affected and some ate sufficient of the plant when first exhibited to cause death after paralysis of the hind quarters. On histological examination, fatty degeneration of the liver was observed.

By reason of its disagreeable taste the authors do not apprehend much danger when herbage is plentiful.—G. D. LANDER.

NILSON, W. L., BOYD, W. L., & FITCH, C. P. (1932). **Studies of the Toxicity of Ammonium Thiocyanate for Cattle.**—*Cornell Vet.* **22**, 347-353. [6 refs.]

On account of its use as a weed killer, the toxic action and dosage of ammonium thiocyanate has been studied. Rabbits were killed within 48 hours by daily doses in capsule *per os* of 300 mg. per kilo body weight. The animals showed dulness, nasal discharge and transient convulsions on handling; there were no gross lesions, but histological examination revealed necrosis of the mucous membranes of the stomach and duodenum, intertubular haemorrhage and congestion of the Malpighian corpuscles and granular degeneration of the liver. A single dose at the rate of 500 mg. per kilo body weight killed a cow from asphyxia in 12 hours 15 minutes, after showing profuse diarrhoea, accelerated respiration and feeble pulse, twitching of the muscles, tucked-up appearance and chronic spasms. The histological findings were similar to those noted in rabbits. Elimination of thiocyanate through the urine was noticed during a fortnight after sublethal dosage.

—G. D. LANDER.

JÖHNK, M. (1932). Bleivergiftung beim Rind. [**Lead Poisoning of the Ox**].—*Berl. tierärztl. Wschr.* **48**, 726.

Two cows were killed by red lead paint which had been spilled on the ground. The symptoms and *post-mortem* appearances were those of acute lead poisoning. Special interest attached to the finding in the alimentary canal contents of black particles about the size of corn grains which on fracture showed the red colour of the paint. An analysis showed 1.903 g. of red lead in 416 g. of stomach contents.

—G. D. LANDER.

HALTENHOFF, R. (1932). Saturnismus acutus bei Rindern und Kälbern. [**Acute Lead Poisoning in Cattle and Calves**].—*Arch. wiss. prakt. Tierhkl.* **65**, 360-370. [25 refs.]

The author gives an account of acute lead poisoning following the consumption of red lead paint scrapings from a trough. The observations made are in accordance with the well-known course of acute lead poisoning.

A test was carried out on a five weeks old calf weighing 51 kg. which received not more than 60 g. of red lead (in the form of the paint scrapings) during three days. Typical symptoms appeared two days later, whereupon the animal was slaughtered. On analysis, 200 g. of liver yielded 0.3 mg. and 60 g. of bile yielded 0.05 mg. of lead.—G. D. LANDER.

THOMAS, E. F., & SHEALY, A. L. (1932). **Lead Arsenate Poisoning in Chickens.**—*J. Agric. Res.* **45**, 317-319. 1 table.

Lead arsenate as used for spraying (8 lb. to 200 gallons with sugar and syrup), when given as the sole water supply to fowls for 60 days caused no ill effect, the daily dose of arsenate amounting to as much as 13 grains per bird. Poisoning was induced by dosage of the arsenate in capsule. The lethal dose was found to be relatively high and erratic; for instance 20 grains caused one death in 6, 60 grains caused 3 deaths in 3 and 80 grains 3 in 6 cases. Death resulted in from 2 to 27 days, the average being nine days.—G. D. LANDER.

PHYSIOLOGY.

STEINHAUS, A. H. (1933). **Chronic Effects of Exercise.**—*Physiol. Rev.* **13**, 103-147. [253 refs.]

This long and complete review of the subject does not admit of adequate

abstraction, and those interested should consult the original paper. The subject is presented under anatomical headings.

MUSCULATURE.—It has been found that increase of musculature is solely due to increase of sarcoplasm, which is due more to the speed of exercise than to its duration; further, in those muscles which are exercised the most, an increase of haemoglobin pigmentation is found. Although an extra store of glycogen occurs in the muscles during the early stages of training, this disappears in the fully trained subject; and since it has been established that, in the presence of sufficient oxygen (as in the trained state), phosphocreatin may be resynthesized without the formation of lactic acid, this disappearance of glycogen is not without significance. However there seems no doubt that increased muscular efficiency is due chiefly to more effective innervation and co-ordination.

CIRCULATORY SYSTEM.—That heart size is proportionate to work done is illustrated by the greyhound which has a heart to body weight ratio of 13·4, which exceeds that of the stag (11·5); formerly the stag was thought to have the greatest ratio in mammals. It is interesting to note that hypertrophy of the heart does not occur in castrated or splenectomized animals during training.

The low pulse rate of the trained both at rest and during exertion is apparently due to increased vagus tonicity. It is noted that cardiac minute-output is greatly increased during work irrespective of training, but that the trained subject shows by far the greatest absolute increase in stroke-volume. In the trained individual pulse pressure is enormously increased, and systolic pressure rises more rapidly and is higher than in the untrained subject; further, in the trained subject diastolic pressure falls to normal even before the cessation of exercise. That these effects are due to a decrease in the amount of lactic acid in the blood, with consequent lack of dilatation of the peripheral blood vessels, and also to an increased elasticity of the aorta, is mooted.

There is no agreement amongst authorities whether there is a lasting change in the number of erythrocytes in the trained subject, but evidence is presented showing that there is an immediate temporary decrease in the red cell count at the commencement of training owing to destruction of older red cells, and that this is accentuated by a more rapid circulation; there is also a decrease of neutrophils at the expense of the older segmented forms, and this causes a relative lymphocytosis. Eosinophilia is observed in the trained dog. It is interesting to note that, whereas in man there is an increase of alveolar carbon dioxide and the alkali reserve, in dogs the blood tends to become alkaline rather than acid due to a "blowing off" of carbon dioxide during panting.

Training appears to stabilize the amount of blood sugar both at rest and during exercise, and reasons for this are discussed.

RESPIRATORY SYSTEM.—Training produces no change in the minute-volume of resting respiration, but results in a more economical ventilation during exercise, inducing slower and deeper movements and a more rapid return to normality after exertion. This is no doubt due to a decreased amount of lactic acid in the blood arising from a better oxygen supply.

Reference is made to SARGENT's ability to predict a runner's time in a race of any length after determining (1) his oxygen cost for running 120 yards at various speeds, (2) his maximum oxygen debt and (3) his maximum oxygen absorption; and HERBST's finding that

$$\frac{\text{maximum } O_2 \text{ absorption rate}}{\text{body weight in kg.}}$$

bears a linear relation to work capacity.

It has not been shown that the increased abilities of the trained individual are due to more economical working of the muscle cell *per se*. In the rat, training does not facilitate learning.

SKELETAL SYSTEM.—Of interest to veterinarians is the section devoted to the production of exostoses by exercise, and many cases are mentioned by way of illustration.

Almost all the systems and organs of the body are mentioned, and the paper should prove of interest to those associated with the training of animals for work or speed.—EDWARD F. PECK.

- I. MEETZ, A. (1932). Der Einfluss des Sumpfschachtelhaulms (*Equisetum palustre*) auf die Zusammensetzung der Milch und des Butterfettes. [**The Influence of Horsetail, *Equisetum palustre*, on the Composition of Milk and Butterfat**].—*Milchwirtsch. Forsch.* 13. 405-430. 10 tables. [13 refs.]
- II. STOCKKLAUSNER, & DAUM. (1932). Ueber den Einfluss der Hypophysenvorderlappenhormone auf die Milchsekretion der Kühe. [**On the Influence of the Hormone of the Anterior Lobe of the Pituitary Gland upon the Milk Secretion of Cows**].—*Ibid.* 448-456. 6 tables. [12 refs.]

I. After pointing out the general effects of equisetosis the author records experiments in which known quantities of fresh plant and of contaminated silages were incorporated in the rations of dairy cows for periods up to about three weeks, and discusses in detail the effects upon the composition and yield of the milk.

There was a very marked fall in milk yield—in one case down to one-fifth in 23 days on contaminated silage. In all cases the specific gravity of the milk was reduced, the fat being raised and the "solids not fat" being reduced—chiefly at the expense of the milk sugar. Increased chloride was characteristic and the fat showed variable changes in physical and chemical properties.

In regard to blood changes inorganic phosphate showed minor variations, but the alteration in the calcium level was very striking—slow preliminary fall from 12 mg. per 100 c.c. to 10 mg. with a sharp rise to 20 mg. on cessation of feeding, maintained above normal even a week later.

The clear demonstration that toxicity of *Equisetum palustre*, the most toxic of the commoner horsetails, is not destroyed in silage-making is of obvious practical importance.

II. Delayed cessation of lactation in milk cows is reported to follow frequently repeated experimental injection of "vantasan," a proprietary extract of the anterior lobe of the hypophysis. Seven cows in the later stages of lactation were compared with seven similar untreated cows. The delay in drying up over 43 days corresponded to 0.44 kg. of milk per head per day [about 4.5 per cent.] in favour of the hormone.—H. H. GREEN.

- OLLIVET. (1932). Examen radiologique de l'appareil digestif du Chien. [**Radiological Examination of the Digestive Apparatus of the Dog**].—*Rec. Méd. vét.* 108. 202-214. 5 figs., 2 plates.

The digestive tract of some 50 dogs was studied radiologically. The opaque substance employed was "gélobarine" which is cheaper than bismuth and well tolerated by dogs. The "gélobarine" was administered in the form of an emulsion (one part "gélobarine" to two or three parts milk) when it was desired to examine the morphology of the different segments of the digestive tract and equal parts of "gélobarine" and finely chopped meat were given as a mash when information as to function was sought. The appropriate doses of the opaque meal are discussed. After preliminary exposures, with the subject in the standing position, to determine

whether the stomach was filled adequately with the "gélobarine" mixture, the examinations proper were conducted with the animal lying either in the sterno-ventral or dorsal position. Satisfactory results were rarely obtained with the lateral position. The findings of COLENSON are accepted as far as the radiology of the stomach is concerned. Interpretation of X-ray images of the small intestines is extremely difficult. The caecum and colon, together with their anatomical relations, are however, easily demonstrated, but an interval of from five to six hours should be allowed between administration of the opaque meal and examination of the colon.

It is emphasized that the X-ray appearances of all parts of the digestive tract may vary widely in different dogs and also occasionally in the same dog at different times.

Movements in the small intestine comprise those of a segmentary nature described by CANNON and peristaltic movements too delicate to be demonstrated radiologically. In the large intestine, the first portion of the colon is the seat of antiperistaltic movements which control filling of the caecum. In the transverse and descending colon the movements are purely peristaltic.—A. A. PRYER.

TECHNIQUE.

COX, H. R., & HYDE, R. R. (1932). **Physical Factors involved in Ultrafiltration.** *Amer. J. Hyg.* **16**. 667-728. 2 text figs., 25 tables, 10 graphs. [72 refs.]

This investigation was undertaken with the object of evaluating the principles involved in ultrafiltration. A modified method for the preparation of Bechhold collodion membranes of very uniform permeability was adopted, using glacial acetic acid collodions varying in nitrocellulose concentrations from 0.25 per cent. to 8 per cent. Standard filter papers were impregnated *in vacuo* after the method of Bechhold. A type of metal ultrafilter was designed capable of filtering large or small amounts of fluid under either positive or negative pressure.

Experiments were undertaken to determine the effects of pressure and temperature on filtration and the influences of viscosity, surface tension, protein adsorption and hydrogen ion concentration upon the permeability of the membranes. Various dyes were specifically adsorbed by the collodion regardless of the electrostatic charge which they carried.

The values of the pore diameters as calculated by Poiseuille's law, were found to compare favourably with observed values of collodion particles of known size.—R. E. GLOVER.

NEVEUX, & MOULUN. (1932). Filtration des excréments de cheval, d'oie, de poule et de lapin avec une presse de ménage. [**Filtration of the Faeces of the Horse, Goose, Fowl and Rabbit with a Household Press**].—*Rev. Path. comp.* **32**. 171-172. [1 ref.]

Faeces of several species of animals and birds were passed through a domestic gravity or vegetable press having a mesh of 1 mm. A considerable amount of liquid was expressed from the faeces of the horse, goose, fowl and rabbit, but with the faeces of human beings, pigs, cows and sheep no liquid was expressed, the entire material passing through the mesh without any separation of the fluid elements. An explanation is sought as to why the faeces of rabbit and cow should behave differently in this respect. It is considered unlikely that the nature of the food is responsible since both animals are herbivores. It is thought more probable that there are physiological differences in the digestion of the cow and rabbit which

may supply the answer. Microscopic examination of the liquid portion of horse faeces, whilst warm, revealed the presence of a flagellate, a spirochaete, several infusoria and helminth eggs. These were present in the faeces of both healthy horses and of those suffering from infectious anaemia. A chemical examination of this fluid after further filtration through filter paper is advocated. Reference is made to the examination of the liquid expressed from the soiled bedding of rabbits as a method of diagnosis in coccidiosis.—A. A. PRYER.

MISCELLANEOUS.

RICHARDSON, A. E. V. (1932). **The Mineral Content of Pastures. Report on Co-operative Investigations in Progress at the Waite Agricultural Research Institute.**—*J. Sci. & Indust. Res. Australia*. 5. 141-151. [24 refs.]

Superphosphate dressings on natural pasture to the extent of 2 cwt. per acre for three years increased the hay yield by 65 per cent. and the phosphorus content of the pasture by 47 per cent. The wool of the sheep grazing on this pasture was not altered either in quality or in quantity. The effects of different phosphates were tried. Rock phosphate was the least efficient. Basic slag, or superphosphate plus nitrate of soda were better than superphosphate alone. In all cases there was an alteration in the botanical composition of the pasture. The application of lime and soluble phosphate to a phosphorus-deficient soil markedly increased the yield, pasture so treated carrying three and a half times the live weight of sheep as compared with the control grazing. The effect of intensities of cutting upon the yield and upon the mineral and the protein content of pasture was also investigated. In *Phalaris tuberosa*, the optimum results were obtained by three cuttings or grazings per season. It is shown that manganese is an essential element for plant growth and that the oxidation reduction equilibrium of the soil has an important bearing on its availability. Manganese-deficient soils can be rendered quite efficient by temporary waterlogging, the results being similar to those obtained by adding manganese sulphate to the soil.—HENRY DRYERRE.

HAMMERS, L. A. (1932). **The Care of the Ewe before and after the Lambing Period.**—*J. Amer. Vet. Med. Ass.* 80. 197-201.

The article is intended for country practitioners who wish to become familiar with the common management and dietetic problems of the sheep farmer. The points dealt with include variation of diet with a view to maintaining health, increasing the number and size of the lambs born and methods of inducing an adequate supply of milk.—R. S. ROBERTS.

OFFICIAL AND OTHER REPORTS.

WALL, S. (1932). Berättelse över Verksamheten vid Statens Veterinärbakteriologiska Anstalt. Räkenskapsåret 1931-1932. [**Report of the Activities of the State Veterinary Bacteriological Institute (Stockholm) for the Financial Year 1931-1932**]. pp. 60. Uppsala: Almqvist & Wiksells Boktryckeri -A.-B. [8vo.]

This report is on the same lines as that for the previous year [abstracted in this *Bulletin*. 2. 584]. The chief financial and other changes in the staff are described in the introduction and nearly all the results of diagnostic work are given in tabular form. This includes, besides bacteriological work, protozoological,

helminthological, mycological, entomological and pathological data, including the diagnosis of suspected cases of poisoning.

Tuberculosis of the udder was given particular attention and the results for each province for the last six years are shown in two tables, the actual number of positive cases together with the figure indicating the infection per 1,000 cows being clearly shown: the highest figure for the latter was 0.5 per 1,000 for Malmöhus Province. [These figures refer only to material sent for examination, it being assumed that there is no routine examination of every cow].

Serological diagnosis is dealt with separately and covers glanders, contagious abortion, equine abortion (paratyphoid), equine infectious anaemia and bacillary white diarrhoea. Glanders appears to be eradicated now and all of 30 cases of suspected equine specific abortion were negative to tests carried out.

The results of diagnostic examination for bovine contagious abortion show the number of infected cases, the total numbers of cattle and the number of infected animals per 1,000 for each province: the most heavily infected provinces show a positive figure of 4 infected farms per 1,000 or thereabouts.

From the beginning of 1932, a method of iron estimation in citrated blood was adopted for the diagnosis of equine infectious anaemia: an iron content of less than 0.32 g. per litre of blood was taken as a positive indication. The disease is only of importance in the northern half of the country.

Bacillary white diarrhoea is not at all widespread, judging from the statistical results.

Vaccines were prepared in large amounts against *Corynebacterium pyogenes*, *Br. abortus*, *Pasteurella* sp., a porcine paratyphoid organism [*Bact. suispestifer*?], streptococci, staphylococci and canine distemper.

Antisera were also prepared in large amounts against anthrax, malignant oedema, swine erysipelas, pyogenic infection, pasteurella infection, "joint ill" in foals, coliform infection, diplococcal infection and strangles. The report contains full details of biological products prepared and issued. The work of the sub-station at Vindeln is described separately and the report concludes with a list of works published during the year by members of the entire staff, nearly all appearing in the *Skand. Vet.-tidskr.*—J. E.

BOOK REVIEWS.

BALFOUR-BROWNE, F. [M.A. (Oxon. et Cantab.), F.R.S.E., F.Z.S., F.L.S., F.E.S., Formerly University Lecturer in Zoology (Entomology) in the University of Cambridge; and later, Professor of Entomology at the Imperial College of Science and Technology, London]. (1932). **A Text-Book of Practical Entomology.** viii + 191. 116 figs. London: Edward Arnold & Co. [Cr. 4to.] [18s.]

That familiar item of the science syllabus "Practical Work" conveys a variety of meaning to different classes of students in colleges and universities, but to the university student of zoology it at once conveys the idea of dissection. It is in that restricted sense that the term "Practical Entomology" is used in the title of this book which may more specifically be termed a guide to dissection and introduction to general and special morphology. It is of an eminently practical nature and takes the student through three courses of instruction, the earlier parts of which are modelled on the instruction sheets used by the author in teaching entomology in the Zoological Department of the University of Cambridge. Twenty-seven pages are given to an elementary course and deal with the dissection

of the cockroach, 66 pages to a more advanced course on general morphology, for which the water beetle (*Dytiscus*) is chosen as the type, and 90 pages to a course on special morphology and systematic entomology. This last deals with the external characters and the dissection of the grasshopper (*Stenobothrus*); a special chapter is devoted to wing venation, but the greater part deals with the external morphology of insect types as an introduction to systematic entomology.

The 116 original diagrammatic illustrations are boldly drawn and marked in a particularly clear way so that there can be no doubt as to exactly what part the legend or the text refers. The special terminology is gradually introduced and each new term adequately explained as it appears. It might be suggested that the value of the book to certain laboratory workers, who make only occasional incursions into this subject, would be increased if the present short index were considerably extended, but to the student taking a university course in entomology it can unhesitatingly be recommended as a clear, concise and well-arranged guide to the practical study of insect morphology.—E. L. TAYLOR.

OPPERMANN, T. [Professor of Pathology and Director of the Medical-Forensic Clinic of Hanover Veterinary College]. (1933). Malkmus-Oppermann. Klinische Diagnostik der inneren Krankheiten der Haustiere. [**Clinical Diagnosis of the Internal Diseases of the Domestic Animals**]. pp. vii + 264. 71 figs. 1 coloured plate. Leipzig: Max Jänecke. 11th Edition. [8vo.] [RM.8.55]

This well-known book has now reached its eleventh edition, which is slightly larger than the tenth edition of 1928 and has five more figures, but does not differ materially from it with the exception that the chapter on blood examination in the diagnosis of diseases incorporates recent advances in veterinary haematology.

The book is of great value to all veterinary clinicians as it contains the essential information in a concise form, so that the reader can look up in a minute all the important methods for examining any body system or organ.

The first quarter of the book deals with general methods used in clinical diagnosis for internal diseases and the rest deals with the various body systems. The numerous figures greatly assist the text.

This book is too firmly established to require further recommendation: the new edition will doubtless be received as favourably as its predecessors.—J. E.